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Descartes

FOR: THE DESCARTES SYSTEMS GROUP INC.

TSE SYMBOL: DSG

OCTOBER 13, 1998

The Descartes Systems Group Unveils Revolutionary
Web-Based Delivery Management System To Monitor The Flow
Of Products Throughout The Entire High-Tech Supply Chain

WATERLOO, ONTARIO--

Energy DeliveryNet.com(TM) Provides End-to-End Visibility of
Inventory Throughout the Entire High-Tech Supply Chain Via Zero
Latency Architecture

In a move designed to improve customer delivery service and
radically reduce inventory levels across the industry, Descartes
Systems Group Inc. (TSE: DSG), a leading provider of supply chain
execution software for delivery-sensitive organizations, today
unveiled a revolutionary Web-based delivery management system to
monitor and track the flow of products throughout entire supply
chains.

Consistent with Gartner Group's new "zero latency" initiative,
Energy DeliveryNet.com(TM) is the first community-shared software
application, allowing all shippers, customers, suppliers,
manufacturers, carriers, freight-forwarders and other trading
partners to have real-time visibility of where products are in the
supply chain via traditional Web browsers.

Descartes also announced today that Pinacor, Inc., a leading
distributor of technology products and services, has selected
Energy DeliveryNet.com(TM) as part of its delivery management
solution. Pinacor will deploy Energy DeliveryNet.com(TM) to
connect its suppliers, value-added resellers, customers and
carriers, creating a collaborative supply chain community.

"Pinacor is a widely regarded leader in using Internet-based
technologies to optimize the high tech supply chain. We are
excited to be playing a key role in Pinacor's delivery management
strategy," said Peter Schwartz, chairman and CEO, Descartes. "This
partnership enhances Descartes' leadership role in providing

end-to-end solutions for companies with dynamic distribution requirements."

"This relationship will leverage our current Energy DeliveryNet.com(TM) implementations which integrate suppliers and manufacturers with their customers, extending the use of the Energy DeliveryNet.com(TM) software by allowing distributors such as Pinacor to connect their high tech supply chains and optimize channel performance," said Art Mesher, Descartes' executive vice president. "Pinacor now has the opportunity to offer a complete solution that provides end-to-end visibility from supplier to customer, including value added resellers and distributors."

Pinacor will join Descartes' growing high technology customer base using Energy DeliveryNet.com(TM), which now includes Ericsson and Packard Bell-NEC.

Ted Rybeck, chairman at Benchmarking Partners stated, "This is a fundamental breakthrough for the high tech industry. The real news here is that Descartes' customers are getting return-on-investment by deploying the kind of trading partner collaboration that will dominate the Internet economy."

The Solution - Energy DeliveryNet.com(TM) Software

Descartes Energy DeliveryNet.com(TM) software suite allows each of its customers to create a collaborative supply chain network. Energy DeliveryNet.com(TM) enables trading partners to share real-time logistics information of products inbound and outbound from the time they leave until the time they arrive at the ultimate destination - all via the Internet. This collaboration has resulted in radical reduction in inventory levels, as well as dramatically improved time-to cash cycles for participants.

Through the Web interface, users will have access to the current status of shipments, and will receive instant notification about any exceptions to their orders and delivery schedules. The system will generate proactive alert messages and notify individual end users for follow-up action. Each end user can customize how they would like to be notified about their searches, alerts and queries for orders and inventory. Energy's event notification framework will leverage the Energy DeliveryNet.com(TM) architecture, supplying dynamic real-time supply chain "messages" to any application connected to this architecture. Any of Descartes' leading supply chain execution components such as routing, direct store delivery and mobile applications can take advantage of these "messages" to re-plan, re-prioritize and re-sequence in real time.

"Today, delivering on commitments is the key to customer satisfaction. Descartes' system is designed to keep all parties in the order-to-delivery operations loop informed," said Mesher. "Our online tools streamline the exchange of order and delivery information, ensuring that the right products are delivered to the right people at the right time. No longer will users be faced with an information gap or latency in the order cycle."

Collaborative Network

Descartes Energy DeliveryNet.com(TM) by design, is the first

software suite to enable a community-shared, Internet-oriented supply chain network. Energy DeliveryNet.com(TM) software provides the infrastructure and Internet visibility for its customers allowing any trading partner to connect using the downloadable intelligent browser, including shippers, carriers, customers, suppliers, freight forwarders and other trading partners giving companies global, real-time supply chain visibility via the Internet.

Closing the Loop on E-Commerce

Energy DeliveryNet.com(TM) is specifically designed to enhance the E-commerce process by integrating electronic catalog and order information into Energy DeliveryNet.com(TM) and then tracking and monitoring the status of order requests as they move throughout the supply chain.

According to Willem Galle, executive vice president of products and technology for Descartes Systems Group, "Today, there has been no real integration between the front end E-commerce catalogs and ordering systems and the back-end logistics processes. While systems have improved the data velocity of the order cycle, they have yet to improve the data velocity of the delivery cycle. In order to cope with this data velocity discontinuity, distributors and manufacturers have been forced to hold extra inventories. Energy DeliveryNet.com(TM) was engineered to eliminate this discontinuity and reduce associated inventories throughout the supply chain."

About Descartes Systems

The Descartes Systems Group Inc. (www.descartes.com) is a leading provider of supply chain execution software. With more than 1,000 customers worldwide, Descartes' solutions are particularly well suited to delivery-sensitive organizations. These companies are forced to respond to changes in demand, often day-to-day or even minute-to-minute, along with the complexities of short product shelf life, price and promotions volatility, high order volumes, and real-time vehicle routing.

Descartes provides full implementation support from initial engagement through enterprise rollout. Descartes' consulting and customer support teams merge industry experience, proven methodology, industry software, and technology to maximize the investment in Descartes solutions. To access more information on Descartes Systems Group and its products go to their Web site at http://www.descartes.com.

All product names used are registered trademarks of the respective owners.

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or
The Barnes Organization
Bruce Wigle
(416) 367-5000
bwigle@barnesir.com

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?show files;ds
File  16:Gale Group PROMT(R) 1990-2003/Jan 14
         (c) 2003 The Gale Group
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         (c) 2003 The Dialog Corp.
File 103:Energy SciTec 1974-2002/Dec B2
         (c) 2002 Contains copyrighted material
File 148:Gale Group Trade & Industry DB 1976-2003/Jan 13
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File 649:Gale Group Newswire ASAP(TM) 2003/Jan 07
         (c) 2003 The Gale Group
File 990:NewsRoom Current 2003/Jan 14
         (c) 2003 The Dialog Corp.


Set      Items    Description
S1         20     (SYSTEM OR SOFTWARE OR COMPUTER? OR APPLICATION)(3N)(SCHED-
                  ULE OR SCHEDULES OR SCHEDULING)(6N)(PERIODIC? OR SEMIMONTHLY -
                  OR SEMI()MONTHLY OR BIWEEKLY OR BI()WEEKLY OR WEEKLY)(3N)DELI-
                  VERIES
S2         14     RD (unique items)
?t2/3,k/all
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 2/3,K/1   (Item 1 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2003 The Gale Group. All rts. reserv.

05687272   Supplier Number: 53590767   (USE FORMAT 7 FOR FULLTEXT)
**Scheduling & MRP: software buyers' guide.(part 4)(includes related article
  on stand-alone scheduling programs)(material requirements planning)**
Ogando, Joseph
Plastics Technology, v44, n2, p38(6)
Feb, 1998
Language: English   Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 1977

...   ERP solution for plastics processors that are shipping discrete
products to their customers on repetitive **schedules** - typically **weekly**
or more frequent JIT **deliveries** . Running on the IBM AS/400 mid-range
computer , CMS/400 includes integrated manufacturing, sales-management,
scheduling, distribution, financial, EDI, accounting, and barcode-label...

 2/3,K/2   (Item 2 from file: 16)
DIALOG(R)File 16:Gale Group PROMT(R)
(c) 2003 The Gale Group. All rts. reserv.

04219853   Supplier Number: 46174061   (USE FORMAT 7 FOR FULLTEXT)
Shaw's Gets Exact on Delivery Schedules
Supermarket News, p24

⬤   ⬤

Feb 26, 1996
Language: English   Record Type: Fulltext
Document Type: Magazine/Journal; Trade
Word Count: 537

...   Conference here Feb. 11 to 14. The conference drew nearly 200
attendees.
     Shaw's warehouse **scheduling** **system** , dubbed 'Door-X,' allows
logistics officials to **schedule** **deliveries** on a daily or **weekly**
basis. The program, which gives officials a day-by-day history of actual
deliveries vs...

  2/3,K/3   **(Item 1 from file: 20)**
DIALOG(R)File 20:Dialog Global Reporter
(c) 2003 The Dialog Corp. All rts. reserv.

26634004   (USE FORMAT 7 OR 9 FOR FULLTEXT)
HK'S WATSONS WATER GOES LIVE WITH DESCARTES ROUTING & SCHEDULING
ASIA PULSE
December 17, 2002
JOURNAL CODE: WAPL   LANGUAGE: English   RECORD TYPE: FULLTEXT
WORD COUNT: 220

   (USE FORMAT 7 OR 9 FOR FULLTEXT)

...   Routing and Scheduling.
     Watsons Water said in a press statement that it plans to optimize
 weekly   routes and **schedules** , rapidly respond to last-minute requests,
and ensure regular, on-time **deliveries** to customers.
     Information from the Descartes **system** about actual deliveries will
also help the company better plan service schedules for customers that...

  2/3,K/4   **(Item 2 from file: 20)**
DIALOG(R)File 20:Dialog Global Reporter
(c) 2003 The Dialog Corp. All rts. reserv.

26520098   (USE FORMAT 7 OR 9 FOR FULLTEXT)
Watsons Water Goes Live with Descartes Routing and Scheduling
BUSINESS WIRE
December 10, 2002
JOURNAL CODE: WBWE   LANGUAGE: English   RECORD TYPE: FULLTEXT
WORD COUNT: 775

   (USE FORMAT 7 OR 9 FOR FULLTEXT)

...   Watsons Water selected Descartes Routing and Scheduling. With this
solution, Watsons Water plans to optimize **weekly** routes and   **schedules** ,
rapidly respond to last-minute requests, and ensure regular, on-time
 deliveries to customers. Information from the Descartes **system** about
actual deliveries will also help the Company better plan service schedules
for customers that...

  2/3,K/5   **(Item 3 from file: 20)**
DIALOG(R)File 20:Dialog Global Reporter
(c) 2003 The Dialog Corp. All rts. reserv.

26518208   (USE FORMAT 7 OR 9 FOR FULLTEXT)
TSX SYMBOL: DSG
CCN NEWSWIRE

                    January 14, 2003 2 10:37

●   ●

December 10, 2002
JOURNAL CODE: WCCN   LANGUAGE: English   RECORD TYPE: FULLTEXT
WORD COUNT: 741

   (USE FORMAT 7 OR 9 FOR FULLTEXT)

...   Watsons Water selected Descartes Routing and Scheduling. With this
·solution, Watsons Water plans to optimize **weekly** routes and   **schedules** ,
rapidly respond to last-minute requests, and ensure regular, on-time
deliveries   to customers. Information from the Descartes **system** about
actual deliveries will also help the Company better plan service schedules
for customers that...

   2/3,K/6   (Item 4 from file: 20)
DIALOG(R)File 20:Dialog Global Reporter
(c) 2003 The Dialog Corp. All rts. reserv.

12823592   (USE FORMAT 7 OR 9 FOR FULLTEXT)
Virginia Heating Oil Dealers Advise Customers to Buy Winter Oil Early
Fred Tannenbaum
KRTBN KNIGHT-RIDDER TRIBUNE BUSINESS NEWS (DAILY PRESS - NEWPORT NEWS,
VIRGINIA)
September 14, 2000
JOURNAL CODE: KDPN   LANGUAGE: English   RECORD TYPE: FULLTEXT
WORD COUNT: 574

   (USE FORMAT 7 OR 9 FOR FULLTEXT)

...   local companies is to cap the price per gallon for customers who
sign up for **periodic** winter **deliveries** . Why? Company officials say
labor and truck fuel are their biggest costs. Being able to **schedule**
truck routes around **deliveries** helps control those costs.
   Some suppliers even have **computerized** systems that can predict when
to make a delivery based on how fast a customer...

   2/3,K/7   (Item 5 from file: 20)
DIALOG(R)File 20:Dialog Global Reporter
(c) 2003 The Dialog Corp. All rts. reserv.

08185676   (USE FORMAT 7 OR 9 FOR FULLTEXT)
Computer Disaster Hits Doulton: Millennium System Hitch Costs Pounds 12m
   Sales
GUY DRESSER
BIRMINGHAM POST, p33
November 11, 1999
JOURNAL CODE: FBMP   LANGUAGE: English   RECORD TYPE: FULLTEXT
WORD COUNT: 577

   (USE FORMAT 7 OR 9 FOR FULLTEXT)

...   a further pounds 1 million on extra staff and shifts to restore the
rate of **deliveries** .
   Although **weekly**   delivery **schedules**   have returned to a similar
level to those in place before the **computer** **system** was installed, the
substantial proportion of the sales lost will fall through to operating
losses...

   2/3,K/8   (Item 1 from file: 103)
DIALOG(R)File 103:Energy SciTec

                         January 14, 2003 3 10:37

00299526   ERA-02-059126; INS-77-017243; EDB-77-137951
Title: Management of the interfaces between construction and startup
Author(s): Anderson, W.R.   (Stone and Webster Engineering Corp., Denver);
    Beatty, D.C.
Title: Nuclear power plant construction licensing and startup
Conference Title: American Nuclear Society's topical meeting
Conference Location: Los Angeles, CA, USA   Conference Date: 13 Sep 1976
Publisher: American Nuclear Society, Inc.,Hinsdale, IL
Publication Date: 1976
p VI.5.1-VI.5.5
Language: English

...Abstract: between construction and startup. These interfaces have
    normally been addressed to the extent that engineering **schedules** ,
    construction **schedules** , equipment **deliveries** and startup test
    schedules have been dovetailed graphically, or **computerized** , and
    periodically updated to reflect significant changes.

 2/3,K/9   (Item 1 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2003 The Gale Group. All rts. reserv.

08911387   SUPPLIER NUMBER: 18538849
Routing software prevents scheduling meltdown. (Baskin-Robbins' dynamic
    routing software)
Logistics Management, v35, n6, p85S(1)
June, 1996
LANGUAGE: English   RECORD TYPE: Fulltext; Abstract
WORD COUNT: 486   LINE COUNT: 00043

...   the computer program at its corporate headquarters and at its four
main distribution centers.
    The **software** builds a **weekly** master **schedule** from information
about the company's regularly scheduled **deliveries** . It will formulate
daily route recommendations when day-to-day deviations from the master
schedule are warranted. It also adjusts the routing schedule in a way that
optimizes the company...

 2/3,K/10   (Item 2 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2003 The Gale Group. All rts. reserv.

08613885   SUPPLIER NUMBER: 18045206   (USE FORMAT 7 OR 9 FOR FULL TEXT)
Shaw's gets exact on delivery schedules. (Shaw's Supermarkets)
O'Leary, Chris
Supermarket News, v46, n9, p24(1)
Feb 26, 1996
ISSN: 0039-5803   LANGUAGE: English   RECORD TYPE: Fulltext; Abstract
WORD COUNT: 572   LINE COUNT: 00050

...   Conference here Feb. 11 to 14. The conference drew nearly 200
attendees.
    Shaw's warehouse **scheduling   system** , dubbed "Door-X," allows
logistics officials to **schedule   deliveries** on a daily or **weekly**
basis. The program, which gives officials a day-by-day history of actual
deliveries vs...

2/3,K/11   (Item 1 from file: 258)
DIALOG(R)File 258:AP News Jul
(c) 2003 Associated Press. All rts. reserv.

01956421 (USE FORMAT 7 FOR FULLTEXT)
Police say bombing suspects still in RI, likely in 'pesantren'
Associated Press
Tuesday, November 19, 2002 09:22 EST
JOURNAL CODE: AP LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 1,987

...fax or e-mail that week's orders to England.

    On Monday nights, England's **computers** take all those orders and
plot out delivery **schedules** . While orders and **deliveries** for most
of the stores England serves are scheduled **weekly** , stores farther
away must compile their orders for two or more weeks. The extreme:
West...   .

2/3,K/12   (Item 1 from file: 262)
DIALOG(R)File 262:CBCA Fulltext
(c) 2003 Micromedia Ltd. All rts. reserv.

03535326   (USE FORMAT 7 FOR FULLTEXT)
**Fresh savings for great ice cream Using a truck-routing system saves
    Baskin-Robbins $180,000 on gas annually and provides consistent on-time
    deliveries to their retail outlets [Performance Truck Routing System]**
Canadian Transportation Logistics v.98(11) November, 1995 pg 49 (951100)
WORD COUNT: 753   RECORD TYPE: Fulltext
COMPANY NAMES: Baskin Robbins

    ...For companies, such as Baskin-Robbins, that use PTRS' master
schedule -based routing option, the first **system** builds a **weekly**
master **schedule** from information about the company's regularly scheduled
deliveries . PTRS will formulate daily route recommendations when
day-to-day deviations from the master schedule...

2/3,K/13   (Item 1 from file: 485)
DIALOG(R)File 485:Accounting & Tax DB
(c) 2003 ProQuest Info&Learning. All rts. reserv.

    ** FULL-TEXT AVAILABLE IN FORMATS 7 AND 9 **
00392071
"High touch" club computing
Kasavana, Michael L
Club Management v72 n1 PP: 108-128 Jan/Feb 1993
ISSN: 0009-9589 JRNL CODE: ACLM
WORD COUNT: 5289 LINE COUNT: 481

Accounting & Tax DB_1971-2003/Jan W1
...TEXT: stored in an electronic mailbox awaiting receiver access. E-mail
users must train themselves to **periodically** check or received files or
schedule E-mail **deliveries** with likely senders.

Bulletin board in bits and bytes. The most obvious **application** of
internal E-mail for club operations is in the area of rapid written
communications...

2/3,K/14   **(Item 1 from file: 610)**
DIALOG(R)File 610:Business Wire
(c) 2003 Business Wire. All rts. reserv.

00822690 20021210344B7518 (USE FORMAT 7 FOR FULLTEXT)
Watsons Water Goes Live with Descartes Routing and Scheduling-Largest Water Company in Hong Kong to Improve Delivery Service
Business Wire
Tuesday, December 10, 2002 19:00 EST
JOURNAL CODE: BW LANGUAGE: ENGLISH RECORD TYPE: FULLTEXT
DOCUMENT TYPE: NEWSWIRE
WORD COUNT: 769

To scale its fleet operations and meet customer commitments, Watsons Water
selected Descartes Routing and **Scheduling** . With this solution, Watsons
Water
plans to optimize **weekly** routes and **schedules** , rapidly respond to
last-minute
requests, and ensure regular, on-time **deliveries** to customers.
Information
from the Descartes **system** about actual deliveries will also help the
Company
better plan service schedules for customers that...
?

Your SELECT statement is:
  s (UPS or United()Parcel()Service) and Roadnet and py<=2000

```
        Items    File
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           13       9: Business & Industry(R)_Jul/1994-2003/Jan 13
            5      13: BAMP_2003/Dec W5
           18      15: ABI/Inform(R)_1971-2003/Jan 14
           67      16: Gale Group PROMT(R)_1990-2003/Jan 14
            8      18: Gale Group F&S Index(R)_1988-2003/Jan 14
           23      20: Dialog Global Reporter_1997-2003/Jan 14
            5      47: Gale Group Magazine DB(TM)_1959-2003/Jan 09
            1      63: Transport Res(TRIS)_1970-2003/Dec
            1      75: TGG Management Contents(R)_86-2003/Jan W1
Examined  50 files
            1      80: TGG Aerospace/Def.Mkts(R)_1986-2003/Jan 14
            5      88: Gale Group Business A.R.T.S._1976-2003/Jan 08
            2     111: TGG Natl.Newspaper Index(SM)_1979-2003/Jan 08
            1     119: Textile Technol.Dig._1978-2003/Jan
Examined 100 files
           74     148: Gale Group Trade & Industry DB_1976-2003/Jan 13
            6     160: Gale Group PROMT(R)_1972-1989
Examined 150 files
            1     233: Internet & Personal Comp. Abs._1981-2003/Jan
            1     247: ONTAP(R) Gale Group Magazine Index(TM)_
            1     248: PIRA_1975-2003/Jan W1
            1     256: SoftBase:Reviews,Companies&Prods._82-2003/Dec
            9     262: CBCA Fulltext_1982-2003/Jan
            1     264: DIALOG Defense Newsletters_1989-2003/Jan 14
           13     275: Gale Group Computer DB(TM)_1983-2003/Jan 14
Examined 200 files
            1     348: EUROPEAN PATENTS_1978-2003/Jan W01
            2     349: PCT FULLTEXT_1979-2002/UB=20030109,UT=20030102
Examined 250 files
Examined 300 files
            1     477: Irish Times_1999-2003/Jan 14
            2     483: Newspaper Abs Daily_1986-2003/Jan 13
            3     484: Periodical Abs Plustext_1986-2003/Jan W1
            1     485: Accounting & Tax DB_1971-2003/Jan W1
            3     541: SEC Online(TM) Annual Repts_1997/Sep W3
            7     542: SEC Online(TM) 10-K Reports_1997/Sep W3
Examined 350 files
           22     545: Investext(R)_1982-2003/Jan 14
           14     553: Wilson Bus. Abs. FullText_1982-2002/Dec
            1     554: TFSD J V & Alliances_1990-2003/Jan 14
            7     570: Gale Group MARS(R)_1984-2003/Jan 14
           16     608: KR/T Bus.News._1992-2003/Jan 14
            1     609: Bridge World Markets_2000-2001/Oct 01
            4     610: Business Wire_1999-2003/Jan 14
Examined 400 files
           21     613: PR Newswire_1999-2003/Jan 14
           26     621: Gale Group New Prod.Annou.(R)_1985-2003/Jan 13
            1     623: Business Week_1985-2003/Jan 13
            1     624: McGraw-Hill Publications_1985-2003/Jan 14
            6     635: Business Dateline(R)_1985-2003/Jan 14
            5     636: Gale Group Newsletter DB(TM)_1987-2003/Jan 14
           42     637: Journal of Commerce_1986-2003/Jan 14
            7     647: CMP  Computer Fulltext_1988-2003/Dec W4
           26     649: Gale Group Newswire ASAP(TM)_2003/Jan 07
            4     654: US PAT.FULL._1976-2003/Jan 14
Examined 450 files
            2     674: Computer News Fulltext_1989-2003/Jan W2
            1     696: DIALOG Telecom. Newsletters_1995-2003/Jan 13
            1     704: (Portland)The Oregonian_1989-2003/Jan 12
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        2    713: Atlanta J/Const._1989-2003/Jan 12
        9    714: (Baltimore) The Sun_1990-2003/Jan 14
        1    719: (Albany) The Times Union_Mar 1986-2003/Jan 13
        1    726: S.China Morn.Post_1992--2003/Jan 13   .
        2    727: Canadian Newspapers_1990-2003/Jan 14
        1    738: (Allentown) The Morning Call_1990-2003/Jan 12
        1    740: (Memphis)Comm.Appeal_1990-2003/Jan 13
   Examined 500 files
        1    764: BCC Market Research_1989-2003/Jan
        2    767: Frost & Sullivan Market Eng_2003/Jan
        1    770: Beverage Marketing Research_2001/Aug
        2    781: ProQuest Newsstand_1998-2003/Jan 14
        3    810: Business Wire_1986-1999/Feb 28
       13    813: PR Newswire_1987-1999/Apr 30
Processing
       23    995: NewsRoom 2000

   64 files have one or more items; file list includes 547 files.
   One or more terms were invalid in 100 files.
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Set      Items    Description
S1       506      (UPS OR UNITED()PARCEL()SERVICE) AND ROADNET AND PY<=2000
S2       284      RD (unique items)
S3       123      S2 AND SCHEDUL?
S4       107      S3 AND DELIVER?
S5        25      S4 AND (PICKUP? OR PICK()UP?)  —rev.all
File    9:Business & Industry(R) Jul/1994-2003/Jan 13
          (c) 2003 Resp. DB Svcs.
File    13:BAMP 2003/Dec W5
          (c) 2003 Resp. DB Svcs.
File    15:ABI/Inform(R) 1971-2003/Jan 14
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File    88:Gale Group Business A.R.T.S. 1976-2003/Jan 08
          (c) 2003 The Gale Group
File   111:TGG Natl.Newspaper Index(SM) 1979-2003/Jan 08
          (c) 2003 The Gale Group
File   119:Textile Technol.Dig. 1978-2003/Jan
          (c) 2003 Inst.of Textile Technology
File   148:Gale Group Trade & Industry DB 1976-2003/Jan 13
          (c)2003 The Gale Group
File   160:Gale Group PROMT(R) 1972-1989
          (c) 1999 The Gale Group
File   233:Internet & Personal Comp. Abs. 1981-2003/Jan
          (c) 2003 Info. Today Inc.
File   247:ONTAP(R) Gale Group Magazine Index(TM)
          (c) 1999 The Gale Group
File   248:PIRA 1975-2003/Jan W1
          (c) 2003 Pira International
File   256:SoftBase:Reviews,Companies&Prods. 82-2003/Dec
          (c)2003 Info.Sources Inc
File   262:CBCA Fulltext 1982-2003/Jan
          (c) 2003 Micromedia Ltd.
File   264:DIALOG Defense Newsletters 1989-2003/Jan 14
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File   348:EUROPEAN PATENTS 1978-2003/Jan W01
          (c) 2003 European Patent Office
File   349:PCT FULLTEXT 1979-2002/UB=20030109,UT=20030102
          (c) 2003 WIPO/Univentio
File   477:Irish Times 1999-2003/Jan 14
          (c) 2003 Irish Times
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          (c) 2003 ProQuest
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          (c) 2003 ProQuest Info&Learning
File   541:SEC Online(TM) Annual Repts 1997/Sep W3
          (c) 1987-1997 SEC Online Inc.
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File 542:SEC Online(TM) 10-K Reports 1997/Sep W3
         (c) 1987-1997 SEC Online Inc.
File 545:Investext(R) 1982-2003/Jan 14
         (c) 2003 Thomson Financial Networks
File 553:Wilson Bus. Abs. FullText 1982-2002/Dec
         (c) 2003 The HW Wilson Co
File 554:TFSD J V & Alliances 1990-2003/Jan 14
         (c) 2003 Thomson Fin Sec Data
File 570:Gale Group MARS(R) 1984-2003/Jan 14
         (c) 2003 The Gale Group
File 608:KR/T Bus.News. 1992-2003/Jan 14
         (c)2003 Knight Ridder/Tribune Bus News
File 609:Bridge World Markets 2000-2001/Oct 01
         (c) 2001 Bridge
File 610:Business Wire 1999-2003/Jan 14
         (c) 2003 Business Wire.
File 613:PR Newswire 1999-2003/Jan 14
         (c) 2003 PR Newswire Association Inc
File 621:Gale Group New Prod.Annou.(R) 1985-2003/Jan 13
         (c) 2003 The Gale Group
File 623:Business Week 1985-2003/Jan 13
         (c) 2003 The McGraw-Hill Companies Inc
File 624:McGraw-Hill Publications 1985-2003/Jan 14
         (c) 2003 McGraw-Hill Co. Inc
File 635:Business Dateline(R) 1985-2003/Jan 14
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File 636:Gale Group Newsletter DB(TM) 1987-2003/Jan 14
         (c) 2003 The Gale Group
File 637:Journal of Commerce 1986-2003/Jan 14
         (c) 2003 Commonwealth Bus. Media
File 647:CMP  Computer Fulltext 1988-2003/Dec W4
         (c) 2003 CMP Media, LLC
File 649:Gale Group Newswire ASAP(TM) 2003/Jan 07
         (c) 2003 The Gale Group
File 654:US PAT.FULL. 1976-2003/Jan 14
         (c) FORMAT ONLY 2003 THE DIALOG CORP.
File 674:Computer News Fulltext 1989-2003/Jan W2
         (c) 2003 IDG Communications
File 696:DIALOG Telecom. Newsletters 1995-2003/Jan 13
         (c) 2003 The Dialog Corp.
File 704:(Portland)The Oregonian 1989-2003/Jan 12
         (c) 2003 The Oregonian
File 713:Atlanta J/Const. 1989-2003/Jan 12
         (c) 2003 Atlanta Newspapers
File 714:(Baltimore) The Sun 1990-2003/Jan 14
         (c) 2003 Baltimore Sun
File 719:(Albany) The Times Union Mar 1986-2003/Jan 13
         (c) 2003 Times Union
File 726:S.China Morn.Post 1992--2003/Jan 13
         (c) 2003 South China Morning Post
File 727:Canadian Newspapers 1990-2003/Jan 14
         (c) 2003 Southam Inc.
File 738:(Allentown) The Morning Call 1990-2003/Jan 12
         (c) 2003 Morning Call
File 740:(Memphis)Comm.Appeal 1990-2003/Jan 13
         (c) 2003 The Commercial Appeal
File 764:BCC Market Research 1989-2003/Jan
         (c) 2003 Business Communication Co.
File 767:Frost & Sullivan Market Eng 2003/Jan
         (c) 2003 Frost & Sullivan Inc.
File 770:Beverage Marketing Research 2001/Aug
         (c) 2001 Bev Marketing Corp of NY
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02008424   (THIS IS THE FULLTEXT)
Lightstone: On *Schedule*
(Lightstone Group specializes in routing and *scheduling* software segment
   of supply-chain-management software market, offering RIMMS (Resources In
   Motion Management System))
Information Week, p 90+
November 24, 1997
DOCUMENT TYPE: Journal   ISSN: 8750-6874   (United States)
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 1298

ABSTRACT:
Lightstone Group Inc (Mineola, NY) is specializing in the routing and
scheduling software segment of the supply-chain-management software
market, offering its RIMMS (Resources In Motion Management System). The
market for routing and *scheduling* sofware is an estimated $150 mil,
according to Tim Harmon, international program director, Meta Group's UK
division, and is the second-fastest growing sector of
supply-chain-management software behind manufacturing production planning.
A typical RIMMS system includes data from various companies, including
Navigation Technologies, which provides navigable map databases. RIMMS also
includes ESRI Inc's Map Objects library of software components and
Lightstone's own mapping software. The full text discusses various
companies that are using RIMMS.

TEXT:
By Karen M. Carrillo

Tuscan-Lehigh Dairies used to *schedule* its *deliveries* the old-fashioned
way--with an atlas, maps, and pins. That was until two months ago, when the
company automated the tedious plotting process.

The Lansdale, Pa., dairy went with RIMMS (Resources In Motion Management
System) routing and *scheduling* software from tiny Lightstone Group Inc.
The Mineola, N.Y., vendor is among a handful of companies specializing in
this segment of supply-chain-management software. For Tuscan, that was
exactly the piece of its business that needed help. "Our vision was to
automate the routing system to maximize efficiency, gain an edge in the
market, have better customer service, and better utilization of vehicles,"
says Salim Baltagi, Tuscan-Lehigh's senior director of distribution.

photo omitted
In general, routing and *scheduling* hasn't been well-served by technology
until recently because of the complexity of problem-solving involved.
"There are very few vendors out there. It's wide open and growing at a fast
pace," says Tim Harmon, international program director at Meta Group's U.K.
division.

Harmon estimates the market for routing and *scheduling* software is worth
as much as $150 million and is the second-fastest-growing sector of
supply-chain-management software, behind only manufacturing production
planning.

With RIMMS, Tuscan expects to significantly improve service to its 8,000
customers across six states, Baltagi says. "A lot of customers have time
windows when you can *deliver*. RIMMS allows us to meet their *schedules*,"
he says. "In our business, with perishable products, it's time-critical."
According to Baltagi, RIMMS also can be reprogrammed to fit the particular
needs of a business. "It's not rigid as other software where you have
parameters that you can't mess with," he says. He expects the package to

worth of materials deployed) if logistics systems provided greater
visibility into inventory. Soon after, the DoD announced its Total Asset
Visibility program and became a major user of RFID and related computing
and communications systems. The idea of visibility is rapidly being adopted
by commercial firms today.

* "RFID represents an important new supply chain technology. RFID provides
opportunities other data carriers can't *deliver*," says Dennis Epley,
senor vice president of the Uniform Code Council, a user association that
is leading one of several efforts to create RFID standards for logistics
applications.

* "Supply chain management applications offer the greatest upside in terms
of growth potential..." market research firm Venture Development Corp.
(VDC) wrote last year in its extensive study on worldwide RFID us-age. VDC
predicted that RFID sales for supply chain applications would reach $146.2
million this year, with compound annual growth of 23.8% from 1997 to 2002.

* "RFID is very exciting. It can provide a solution to a number of
different problems," says Larry Sur, founder of ilogistics.com, a start-up
that provides technology consulting and services to logistics providers.
Sur retired last year from a 22-year career at Schneider National, where he
was founder and president of Schneider Logistics. "Properly applied, RFID
has a tremendous amount of merit."

Sur's comments show the promise and the progress of using RFID is
logistics. He's a believer in the technology--if it's "properly applied."
Finding the proper application is difficult. To decide if RFID is a
valuable resource for logistics, it must be analyzed for specific
applications. You are therefore charged with rendering a verdict on three
separate counts (see casework below).

photo omitted

Case #1: Container tracking

DEVIL'S ADVOCATE: Viking Freight (Exhibit H) and others have expressed
concerns that the metal found in dock environments could affect tags,
hurting cross-dock performance. Unilever is concerned about the per-tag
cost because of the thousands of pallets it would have to fully convert to
RFID-based management. *UPS* (Exhibit F) and Viking Freight, which track
individual items by bar code and use portable computers and wireless
communications to track items in transit, say their existing
infrastructures work very well and would not be substantially improved with
RFID.

PLAINTIFF: RFID enables hands-free, automatic identification, routing and
handling of pallets, unit-load devices, mailbags and other shipping
containers. Because of their data capacity, RFID tags can both identify the
shipment and serve as an electronic manifest of what's inside.

WITNESSES FOR THE PLAINTIFF: The DoD, Sainsbury's (Exhibit C), the Port of
Singapore, U.K. express *delivery* firm LynxExpress (page 30) and the
Italian postal service have each deployed container-level RFID systems.
Unilever (Exhibit G) reduced labor needs by two-thirds and improved order
fulfillment time 20% after implementing RFID on pallets at one European
warehouse. The U.S. Postal Service (USPS) has conducted successful trails.
Many logisticians have endorsed the concept.

"The best scenario is a combination of RFID and bar code technology," says
Bob Van Zandt of iLink Global, a new company that provides automated
container management solutions. iLink Global supports bar code and RFID but
doesn't have any customers using RFID yet.

Case #2: Mail/parcel tracking

DEVIL'S ADVOCATE: The USPS has conducted multiple trials but has not committed to a roll-out; German express parcel carrier DPD has not issued public updates after the initial announcement of its trial. *UPS*, Lockheed Martin Postal Systems (Exhibit E) and others are concerned that current RFID anti-collision capability--which ensures every tag in the field is read, and read only once--is not 100% accurate at the high speeds at which mail and express parcels are sorted. Despite falling RFID tag cost, the sheer volume in parcel and mail applications makes cost justification difficult.

PLAINTIFF: Because no line-of-sight is needed between an RFID tag and reader, RF-tagged parcels and letters can be sorted faster and with less handling than bar-coded items. RFID could also automatically find misrouted/lost pieces.

WITNESSES FOR THE PLAINTIFF: DPD conducted a successful smart label trail last year. The USPS has applied RFID to selected items to identify bottlenecks and measure performance as items move through processing operations. LynxExpress has a full RFID system running.

The Italian postal service uses RFID at the mail-bag (container) level for high-speed sortation of its priority mail, which must be *delivered* within 24 or 48 hours. The postal service chose 13.56MHz RFID to replace it bar code system. It afforded faster sorting because there are no orientation concerns, according to Stephen Crocker of Escort Memory Systems, which provided the RFID system.

Like the USPS, the Italian postal service also put mail, with RFID tags inside, through the system to track processing times and identify bottlenecks.

Case #3: Trailer/equipment tracking

DEVIL'S ADVOCATE: Even companies that say they won't use RFID for this application see tremendous merit in the combination. Once again, an existing tracking infrastructure is the biggest drawback to a successful RFID implementation. Companies like J.B. Hunt and Schneider, which track their fleets with GPS technology, may not find enough additional benefits to implement RFID. Same goes for firms whose drivers have wireless hand-held computers.

PLAINTIFF: Having 100% accurate, real-time knowledge of the location of expensive assets will improve utilization, reduce the need for back-*ups* and improve cash flow. Trailer and equipment tracking is a similar application to asset management, where there are numerous real-world RFID success stories.

WITNESSES FOR THE PLAINTIFF: Associated Food Stores (Exhibit A) expects ROI in one quarter through decreased leasing and other charges from its RTLS-based yard management pilot program to identify tagged railcars with track-side readers and expects it to prove cost-effective compared to systems that rely more heavily on satellite tracking and communication. Ford and GM have ongoing programs to track forklifts internally with RFID.

Closing arguments

DEVIL'S ADVOCATE: There is no denying RFID can be very beneficial for logistics applications. The DoD and LynxExpress prove that every day in the real world, and the technology has proven itself in numerous trials. But why hasn't the user base widened? Why aren't there any open supply chain applications, where tags are read by more than one user company? Why has the USPS, a crown jewel in logistics automation, started and stopped numerous projects?

The reasons RFID hasn't been more widely adopted are cost, standards and effective alternatives. Bar code, portable computing, GPS and wireless data networks can provide similar functionality to RFID technology.

The alternative technologies are all well-supported with technical and application standards. These standards ensure interoperability and level the field for competition, which drives product innovation and keeps prices in check. There are several promising RFID standards developments underway. If, in a year or so, these standards are ratified, the case for RFID could change dramatically.

PLAINTIFF: The same standards and cost issues existed when the DoD, Sainsbury's, the Italian postal service, LynxExpress, Ford and GM committed to RFID technology, and they have received countless benefits since making that commitment. Even though the case for RFID might be weakest at the item level, the world's leading consumer goods manufacturers, including Procter & Gamble, Unilever, Eastman Kodak, International Paper and others, are funding extensive research and conducting trials because they see RFID as the future technology of the supply chain. Major retailers are following suit. The Uniform Code Council, which put U.P.C. bar codes all over the world, supports these efforts and additional RFID projects.

Even companies who probably won't use RFID say it could be useful; review the comments by *UPS* and Viking Freight, two logistics innovators. The main thing holding them back is their infrastructures. RFID technology has improved its range, speed and cost since these infrastructures were put in place, and continual improvement is a certainty. If you are currently creating your logistics technology infrastructure, RFID deserves a long look.

Ladies and gentlemen of the jury, the case is in your hands.

Exhibit A

Associated Food Stores

PROFILE: Associated Food Stores (AFS) is a grocery cooperative in Utah that serves 700 stores. It is currently moving into a new 1-million-square-foot distribution center (DC) in North Ogden, which is being outfitted with multiple automated systems.

EXPERT WITNESS: Tim Van de Merwe, internal logistics manager. Began research and development of RFID and software systems to replace paper-based driver check-in and shipment tracking systems that currently require hundreds of manual data inputs daily.
TECHNOLOGY SYSTEMS: Current operations are primarily paper-based; yard management done by CB radio. "My data accuracy is never, ever 100%," says Van de Merwe. The new facility will have an automated warehouse management system and a separate driver check-in and management system. The yard management system included with the WMS did not offer enough functionality, so Van de Merwe investigated RFID options.

RFID INVOLVEMENT. He has committed to a trial of real-time locating system (RTLS) RF technology for yard management. Site surveys are being conducted now, and the trial is *scheduled* to begin Oct. 1. The system will automatically detect and report the location of 700 pieces of equipment, including dollies, tractors and trailers. The RTLS system will feed real-time location data every 15 seconds to AFS' yard management and warehouse management software applications, which will direct handling, putaway and storage operations. The system integrates RTLS technology from PinPoint, EXE Technologies' warehouse management software and routing software from *RoadNet*.

TESTIMONY: Van de Merwe thinks the integrated system may pay for itself within a single quarter by improving asset utilization and eliminating lost shipments and assets. Additional real-dollar savings will come from eliminating manual data entry, which now takes two to six hours each day. "We could have justified RFID just to check trucks in and out. It would have been worth it just to have 100% accurate data," says Van de Merwe.

EXHIBIT B

International Paper

PROFILE: International Paper is the world's largest paper and forest products company, producing more than 10 billion packages annually. The company is a sponsor of the MIT Auto-ID Center, which is conducting high-level research to create wireless item identification technology.

photo omitted

EXPERT WITNESS: Stephen Van Fleet, program director for e-packaging.

RFID INVOLVEMENT: Van Fleet has identified 11 different RFID applications, from internal materials management to supply chain communication. An Andersen Consulting study commissioned by International Paper found RF-enabled e-packaging programs could provide $70 billion in supply chain savings.
Van Fleet is directing a trial of Motorola's BiStatix RFID technology that uses conductive ink to communicate data. The technology is months away from being commercially available, but International Paper has successfully applied it to 10,000 cartons in the trail.

Of the 11 applications identified, International Paper is implementing two this year: RFID labels for package identification and internal material management. Others are on hold because of concerns the company may require more functionality (read range, anti-collision) or production capacity (especially for BiStatix) than RFID vendors can offer. Is working with multiple RFID suppliers and evaluating different frequencies. "We're not hanging our hat on one particular technology," says Van Fleet.

TESTIMONY. "The concept of using the package, as it goes through the supply chain, as an information device is not that big of a leap of faith," says Van Fleet. "Our value proposition doesn't stop in our own warehouse."

He thinks RFID will prove very effective in the materials management trial for tracking large paper rolls. The key advantage: No direct line of sight is needed between reader and tag. At larger warehouses, RFID tags will be used in conjunction with indoor GPS receives, offering functionality similar to real-time locating system technology, which Van Fleet has also investigated and is positive about.

RFID is cost-justifiable on packaging and for multi-user supply chain applications, but even the lowest-cost tags are too expensive for item-level use on consumer goods. "I don't think anyone is going to make any money putting chips into packages. Serving data and converting it into knowledge is where the value is."

EXHIBIT C

J. Sainsbury

PROFILE: Operates Sainsbury's, a leading U.K. grocery chain.

EXPERT WITNESS: Darren Ratcliffe, J. Sainsbury.

RFID INVOLVEMENT: Sainsbury's began a pilot to tag pallets of chilled

foods in a DC, as first profiled in our December 1999 edition. The pilot was so successful that the company is currently implementing the full-scale system that will eventually identify all perishables. Plans call to have 11 million pallets tagged by 2003. Sainsbury's suppliers attach RFID tags with product descriptions and use-by dates on crates of goods shipped to the Sainsbury's DC.

Tags are read for automated receiving and putaway. RFID enabled faster sorting and putaway of incoming shipments. The system also monitors product life cycle, helping to eliminate millions of dollars worth of spoiled food.

TESTIMONY: "RFID systems were selected, as the company could see from a very early state that this would be the future of the supply chain," says Ratcliffe. "The whole process means the store can increase availability to our customers. This is because any 'shorts' in the orders are detected a lot earlier in the supply chain.

"By recording the sell-by date on the tag, we are automatically tracking date-code compliance in the supply chain and providing stores with guidance on rotating stock. The multi-million-pound savings here come from a significant reduction in stock losses."

EXHIBIT D

ilogistics.com
PROFILE: ilogistics.com is a start-up providing strategic and technology consulting to logistics providers. The company consults on topics ranging from where to locate a DC, to operations modeling, to technology selection.

EXPERT WITNESS: Larry Sur, founder. Sur retired from a 22-year career at Schneider where he served as CIO and was founder and president of Schneider Logistics. Sur is also on RFID provider Savi Technology's advisory board.

RFID INVOLVEMENT: Sur worked with the DoD to develop RFID-based logistics systems and has evaluated many RFID technologies and vendors. Also evaluated RFID for use at Schneider and on behalf of clients.

TESTIMONY: "Properly applied, RFID has a tremendous amount of merit," says Sur. As for what constitutes "properly applied," he considers pallet/unit load tracking and identification of high-value assets ideal applications. "The ability to identify anything inside a container without opening the container has a lot of value. It enables true inventory management because you can see inventory in transit."

Sur is a proponent of using RFID in combination with bar codes to create comprehensive, cost-effective solutions. For example, bar-coded individual items would be loaded into containers tagged with RFID. "Each technology has its own place. You have to let the cost analysis speak for itself.

"RFID technology is very exciting. Depending on the application, it can provide a solution to a lot of different problems."

EXHIBIT E

Lockheed Martin Postal Systems

PROFILE: Lockheed Martin Postal Systems is the U.S. Postal Service's (USPS) prime contractor for automation systems. In March, Lockheed Martin was awarded a $73.4 million contract from the USPS for mail identification and sorting, and in April received an additional $15.5 million contract for a bar code-based tray routing system.

EXPERT WITNESS: Bill Terry, technology director. Terry evaluated RFID

technology before selecting holographic bar code scan tunnels for the tray-sorting system. He has been evaluating RFID for about three years. Terry is a Frontline Solutions subscriber.

TECHNOLOGY SYSTEMS: The scan tunnel system identifies and sorts mail trays for routing as cargo to commercial airlines. The singulator, scan and induction unit (SSIU) system Lockheed Martin is providing as part of the $73.4 million contract reads bar codes on individual mail pieces for handling and routing.

RFID INVOLVEMENT: Lockheed Martin Postal Systems has not utilized RFID technology in any commercial systems. Terry has conducted internal tests plus trial systems for customers.

TESTIMONY: Terry considers RFID a good possible match for two applications: identifying unit load devices (including pallets and rolling stock); and high-speed identification where item orientation is variable.

"There are obvious advantages to RFID whenever you're handling boxes or pallets and you don't have to worry about orientation," says Terry.

EXHIBIT F

UPS

PROFILE: The *delivery* giant completes 12 million *deliveries* for 1.2 million customers each day and has 43 million parcels in its logistics pipeline at any given time. *UPS* has 1,200 buildings, including 200 "major" facilities in the United States alone.

EXPERT WITNESS: Mark Lewis, customer information manager. Lewis is heavily involved in RFID, bar code and other technology evaluation and represents *UPS* on several international technology standards committees. He also was heavily involved in *UPS*' development of MaxiCode, a two-dimensional bar code created to sort packages that is now widely used. Lewis is a Frontline Solutions subscriber and has spoken at our conferences.

TECHNOLOGY SYSTEMS: *UPS* has some of the most automated and sophisticated logistics systems in the world, ranging from high-speed bulk sorting equipment to wireless hand-held computers for *delivery* confirmation.

Packaged tracking and sorting is bar code-based; hundreds of thousands of *UPS* customers apply bar codes to their parcels prior to *pickup*.

RFID INVOLVEMENT: No enterprise-wide deployments. Conducting or planning trial systems for asset management of ramp equipment, tractors, trailers and other equipment. Extensive bar code infrastructure and item volume makes RFID implementation for parcel tracking unlikely.

TESTIMONY: Lewis has followed RFID technology for years and says it has improved greatly, in part because of the logistics projects implemented by the DoD.

RFID could be beneficial for container-level tracking, but probably not at *UPS*, where existing bar code systems are very successful.

RFID is not best suited as a bar code replacement but can be valuable if applications are designed to take advantage of its unique characteristics. "If you're only going to use RFID as a bar code, the opportunity (for benefits) is limited," Lewis says.

EXHIBIT G

Unilever

PROFILE: The global consumer goods giant recently announced a new growth initiative to trim its portfolio to 400 brands and boost profitability through improved responsiveness and supply chain management. Recent acquisitions include Ben & Jerry's ice cream, and Slim-Fast Foods. Go figure.

EXPERT WITNESS: Charles McEvoy, senior logistics engineer. Frontline Solutions subscriber.

TECHNOLOGY SYSTEMS: Unilever has multiple automated systems and has consistently taken leadership roles in testing new technologies and programs. An active contributor to UCC/EAN standards initiatives, Unilever also sponsors the MIT Auto-ID Center, which is researching and creating next-generation wireless identification technology.

RFID INVOLVEMENT: McEvoy wants to lower the cost of processing thousands of pallets in a warehouse and is exploring RFID as an alternative to standard SSCC-18 bar code shipping labels. The tags would be read to record materials received and would possibly be used for automated cycle counts. McEvoy hasn't conducted a thorough performance evaluation or cost justification yet. He previously tested robotic palletizing and other technologies.

Unilever Italia implemented an internal pallet tracking system that reduced labor needs by two-thirds and improved order fulfillment time 20%.

TESTIMONY: McEvoy sees tremendous value in the functionality RFID could provide, if he can find technology that can provide the read range he needs at an acceptable price.
"As far as using RFID in the warehouse, I think it's a great thing. You wouldn't have to worry about dirt, bar code printing issues or the rotation of the items.

"(However,) I'm not going to add $4 to $5 to the cost of every pallet to use RFID, because you're talking about hundreds of thousands of pallets."

EXHIBIT H

Viking Freight

PROFILE: Viking Freight is a regional LTL carrier serving the Western U.S. The company completes 13,000 shipments a day; 70% of shipments are one-day *deliveries* and 26% are two-day. Viking Freight operates 65 service centers and a fleet of 7,660 vehicles.

EXPERT WITNESS: Randy Gardner, vice president of information technology. He claims limited in-depth knowledge of RFID technology but has extensive experience in logistics information systems.

TECHNOLOGY SYSTEMS: Shipments are bar coded and drivers carry hand-held computers to record *deliveries* and *pickups* by scanning.
Rollout of upgraded terminals was completed in May. Data is transferred between drivers and host systems using the BellSouth Wireless network.

RFID INVOLVEMENT: No RFID systems in place. Considering RFID to sort cross docks, but has concerns about metal in environment. Sees potential benefits for yard management, but existing system does well. Not considering RFID for item-level tracking.

photo omitted

TESTIMONY: "For a company that doesn't have the technology infrastructure we do, RFID would be valuable," Gardner says.

Customers: Tuscan-Lehigh Dairies, Whirlpool, U.S. Computer Group

DATA: LIGHTSTONE GROUP

 5/9/2   (Item 1 from file: 13)
DIALOG(R)File   13:BAMP
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01169106   02479244   (THIS IS THE FULLTEXT)
The Jury's Out in the case for RFID in logistics
(Article considers the case for using radio frequency identification
   technologies in logistics applications)
Article Author(s): Burnell, John
Frontline Solutions, v 1, n 6, p 18-20,22+
June 2000
DOCUMENT TYPE: Journal (United States)
LANGUAGE: English RECORD TYPE: Fulltext
WORD COUNT: 4089

TEXT:
By John Burnell

EDITOR-IN-CHIEF

photo omitted

Read this feature to:

* Evaluate the effectiveness of RFID in logistics applications.
* See why end users are/aren't using the technology.

* Learn from the early adopters.

Hear ye! Hear ye!

The Court of Public Opinion is now in session. Today we are considering the
case for using radio frequency identification (RFID) technologies in
logistics applications.

RFID vendors ("The Plaintiff") claim their technology offerings can bring
substantial benefits to logistics operations. They are seeking greater
awareness and acceptance of their technology offerings.

They are also seeking a greater share of the billions of dollars spent each
year one logistics technology, including bar code, portable computing and
wireless communications systems, which have proven themselves effective.
The burden of proof as to whether today's RFID technology is a good
investment for logistics managers falls to the vendors.

Readers, you will serve as jury in this case. It is your systems and your
money at stake.
You will hear from early adopters, learn about new pilot projects and learn
what the people responsible for some of the largest operations in the world
think about RFID.

Ladies and gentlemen of the jury must weigh this evidence render a verdict as to whether RFID is a viable, cost-effective technology for logistics applications. The testimony presented here will help you make in formed rulings on:

* The benefits and drawbacks to using the technology at the vehicle, container and unit levels;

* The suitability for RFID in yard management operations;

* Whether RFID should replace or complement bar code technology

Opening arguments

The Defense

Jurors, despite the apparent benefits of RFID, these benefits are largely unproven in ongoing, real-world applications. Perhaps the largest and most enthusiastic user of RFID technology is the U.S. Department of Defense (DoD). There is no denying that the DoD's RFID-enabled logistics systems have been highly beneficial (see the AHRIST profile on page 28 for an example). However, it must be noted that the military doesn't need to satisfy the same cost-benefit requirements of commercial companies. The defense will be presented by the DA, which in this case stands for Devil's Advocate.

The defense will show:

* How early adopters of RFID are hedging their investments by using multiple technologies and vendors;

* The current state of standards efforts and how this has hurt adoption; and

* Challenges faced (and overcome) by real-world users.

The Plaintiff

Any RFID vendor pursuing the logistics market could make powerful statements about how the technology could revolutionize logistics. These statements are frequently made and infrequently verified. The latest example came in an April Wall Street Journal article, which used words like "groundbreaking" and "Holy Grail" in reporting on an RFID technology.

That type of excessive hypes has made a fair trial difficult. After interviewing the key parties cited, the judge (editor) is ruling the Wall Street Journal article as inadmissible evidence. It generated extensive pretrial publicity, but did not paint a complete picture of the projects profiled. Consider instead the following evidence from more credible (and move restrained) sources:

photo omitted

* A study by Andersen Consulting for global packaging giant International Paper (See Exhibit B, page 24) found $70 billion in potential supply chain savings if "e-packaging" utilizing RFID technology was widely adopted.

* The DoD has invested millions of dollars in RFID and other technologies to speed deployment of arms and critical supplies to combat troops. After troop readiness concerns surfaced during Operation Desert Shield and Desert Storm, the DoD initiated a big effort to see how technology could improve its logistics operations. A landmark study concluded the DoD could have saved $2 billion in materials inventory (out of a total of $2.7 billion

eliminate overlapping routes, cut mileage and driver time--and pay for itself within a year.

Route-Finder
A typical RIMMS system starts at about $30,000, according to Lightstone. It includes data from various companies, including Navigation Technologies, which supplies navigable map databases. RIMMS also incorporates ESRI Inc.'s Map Objects, a library of software components, and Lightstone's own mapping software. Users add their own data, such as routes, number of *deliveries*, and customer requirements. The software then determines which technician to send and which route is best, plus the best *delivery* time and other details.

RIMMS is able to quickly handle *pickup* and *delivery* time changes, says Greg Girard, a senior supply-chain analyst at Advanced Manufacturing Research in Boston. "It can immediately find an address and determine where to allocate that *pickup*. The ability to handle a dynamic tool is something the other guys don't have." RIMMS opens up the opportunity to let the enterprise interoperate with the applications of suppliers, partners, and customers, he adds.

Other vendors offering specialized routing and *scheduling* products include Roadshow International Inc., which was acquired this month by Descartes Systems Group; *Roadnet* Technologies Inc., a division of *United* *Parcel* *Service*; and Caps Logistics.
Companies such as Manugistics Inc. in Rockville, Md., offer enterprisewide application suites that include routing and *scheduling* applications. Companies sometimes go for big-name vendors without realizing the implications for their business and then have to turn to companies like Lightstone that offer more customized solutions, says Tom Gormely, a senior analyst at Forrester Research in Cambridge, Mass.

Lightstone, founded in 1989 by three people, initially developed the MachUp airline *scheduling* system. That product was sold to American Airlines' Sabre Group. Today, privately held Lightstone has grown to 17 employees and has revenue of nearly $5 million a year.

photo omitted

"We're not generalists," says co-founder and CEO Kenneth Bob. "We have a horizontal technology that focuses on optimizing resources. What is significant is the flexibility of the system and its ability to serve so many industries."

Other Uses

While the RIMMS system is predominantly used for routing vehicles, some customers use it to serve other facets of their business. Pathology Laboratories in Toledo, Ohio, a clinical testing lab that serves physicians, nursing homes, and hospitals, went live with RIMMS three months ago and used it to prepare a bid on a large insurance account.

By entering data about the number and locations of stops under the contract, RIMMS determined how many more cars the lab would need, and how many more miles would be driven each day to service the account--which was potentially worth $250,000 a year and would add as many as 15 staff positions at the lab. "That was essential for us to be able to bid on the account," says Smith. "Prior to RIMMS, we would have guessed. I wouldn't have had concrete data to estimate the cost. We wouldn't have known if it was going to be profitable."

Pathology Labs also uses RIMMS's routing and *scheduling* capabilities for dispatching drivers. Stage one of the routing and *scheduling* project was to restructure routes and create a more efficient system, says Karen Smith,

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Stage two, set to begin next month, will identify lower-volume accounts and *schedule* them for just one stop a day. "It'll create efficiency and less mileage," says Smith. Another goal will be to assign route numbers to drivers so they can receive only information that's pertinent to their routes, such as doctor reports and supplies.

A second system is *scheduled* to be in place by January for the lab's house-call division, which provides blood-drawing services to some 45 nursing homes and 100 private customers a day. The system will help dispatch the lab technicians and route them efficiently. "You can't send someone out for eight hours, because you have to bring back the blood," says Smith.

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For U.S. Computer and other companies, this new segment of the supply-chain-management software market is providing the means to improve customer service and at the same time save money. "The savings we'll get is tremendous," U.S. Computer's Cogen predicts. "We expect cost saving in routing, tracking the mileage, manpower and efficiency, and reducing manpower in decision making and routing technicians."

At A Glance

Lightstone Group

Headquarters: Mineola, N.Y.

Founded: 1989, by Kenneth Bob, CEO; David Lichtenstein, president; and Timothy Peierls, VP of development

Employees: 17

Flagship product: RIMMS routing and *scheduling* software

Online resource

Visit the online RFID Source Book (www.autoidnews.com/rfidonline) to learn more about RFID and RTLS technology. This unique resource was recently updated and includes dozens of RFID user profiles, white papers, educational features, technology assessments plus hundreds of links to technology vendors and other resources.

Lockheed Martin's Terry is not enthusiastic about using RFID for item-level (in this case letters or parcels) identification. He has concerns about the anti-collision capabilities of existing RFID technology, which ensures that all tags in a field are read once and only once. He also notes that letters and mail trays are easy to orient and thus can be processed by bar code. Orienting larger containers requires more handling, driving up costs and presenting a better opportunity for RFID technology to provide a good ROI.

COMPANY DEPARTMENT NAME: Information Technology; Operations
CONCEPT TERMS: Information Technology; Operations; Logistics; Technology
    application
GEOGRAPHIC NAMES: United States   (USA)

ABSTRACT:
Cutting-edge firms are finding that Internet-based order entry system, together with solid warehouse management systems at the back end are vital to success in the Web economy. A variety of technologies and strategies are permitting peaceful coexistence between distribution centers and the Internet. In order to meet what ARC Advisory Group's senior supply chain analyst Steve Banker considers the "perfect order fulfillment metric, firms must be able to *deliver* client orders on time, ship the proper quantities, offer what the client wants with no unauthorized substitutions, and bill the client correctly. Banker said that reaching the perfect order fulfillment metric needs more than WMS with a sharp Internet interface. E-fulfillment process management solutions help offer visibility into inventory and more. Although a well-designed WMS fits into the e-fulfillment picture, ARC Advisory Group considers this market segment to be much broader. Emerging methods, including e-fulfillment, are helping businesses get products to the consumer on time, in the right quantity and without unauthorized substitutions. The melding of established warehousing/distribution methods with the ability to handle high volumes of online orders will differentiate the winners from the losers on the Internet.

TEXT:

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By Rick Gurin

ASSOCIATE EDITOR

A variety of technologies and techniques are allowing peaceful--even profitable--coexistence between distribution centers and the Internet

Pundits have been saying for centuries (or so it seems) that the Internet and its accompanying electronic exchanges are the next great frontier of business. Attach an "e" before any process and it automatically gains more prestige. A recent advertisement from Microsoft (marketing its e-business solutions, of course) points this out. After flashing a series of "e-terms" influencing business today (e-retailing, e-cubicles, etc.), it finally stops on one word:

e-nough.

A funny thing happened somewhere along the line, however. Many organizations, particularly retail operations, can't get e-nough of the Web. In both business-to-consumer (B2C) and business-to-business (B2B) settings, the Internet is becoming a powerful tool that cannot be ignored.

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The World Wide Web is impacting traditional warehousing and distribution operations in two ways. First, it is leading to a spate of "Web-enabled" warehouse management systems (WMS). Secondly (and most importantly), a critical mass of software vendors are moving beyond Web-enabled applications to what analysts are calling "e-fulfillment solutions." Although vendors vary on the exact definition, most Web-enabled systems offer traditional warehousing functionality with an Internet twist: namely, the ability to either access data or even install systems on line. While WMS vendors have promoted Web-enabled technology since late 1998, users are now starting to consider adopting the technology more strongly.

While Web front ends may appeal to companies concerned with B2B transactions, the latest Internet-induced wave impacting the warehouse is being led by organizations interested heavily in B2C applications. These companies, particularly Internet retailers and traditional retailers breaking into the "com" space, realize thé traditional fulfillment practices their warehouses employ just won't cut it in the Internet economy. So, through a combination of technology and revamped techniques, these companies are beginning to create e-fulfillment solutions (See chart on p. 63).

New work flows, new ways of thinking

As Internet-based companies continue to think "outside of the box" in terms of sales and marketing strategies, ARC Advisory Groups Senior Supply Chain Analyst Steve Banker says their back-end systems need to adapt to these changing work-flow patterns. "Traditional WMS software is too silo-specific. It won't be able to ride the Internet wave as effectively as (e-fulfillment software) could."

So how can cutting-edge companies successfully ride the Internet wave? By trying to meet what Banker calls the "perfect order fulfillment metric." This means to be a key player in the .com world, companies must be able to:

* *deliver* customer orders on time,

* ship the proper quantities,

* provide what the customer wants with no unauthorized substitutions,

* bill the customer correctly.

More than a Web-based front end

According to Banker, reaching the perfect order fulfillment metric requires more than a WMS with a slick Internet interface. "In of itself, an Internet front end provides limited value" he says. "E-fulfillment process management solutions help provide visibility into inventory and more." Although a well-designed WMS fits into the e-fulfillment picture, ARC Advisory Group considers this market segment to be much broader. In its "E-Fulfillment Solutions for E-Business Worldwide Outlook," the firm says e-fulfillment applications include online order management; online product configurators; constraint-based, capable-to-promise engines; transportation management; and e-fulfillment process management systems. In other words, it takes a total package to *deliver* the goods effectively.

Growing marketplace

Lest it appear "e-fulfillment solutions" is simply a term looking for a market, research from ARC shows that a substantial marketplace today for these products and services does exist. It is projected to grow rapidly in the next few years. According to ARC figures, worldwide shipments of e-fulfillment solutions are expected to grow from $493 million in 1999 to nearly $3.6 billion in 2004, a cumulative average growth rate of almost 50%. This rapid expansion is being fueled by demands put on companies engaged in e-business.

They are quickly learning that a fancy Internet storefront and slick marketing don't bring customers back. Rather, best-of-class *delivery* service does.
photo omitted

Options abound

As with just about any complex distribution problem, there's more than one way to approach e-fulfillment "Not one solution fits all," Banker says. "Different vendors bring different attributes to the table." These differences can be broken down by technology offerings and market, just to name two.

From a technology point of view, end users can look for best-of-breed software that focuses on each segment of the e-fulfillment equation, or they can search for broader software suites. The sticking point, of course, is integration.

A number of companies have specific software solutions that handle many aspects of e-fulfillment. WMS providers like Intrepa and AllPoints Systems have software geared toward picking larger volumes of smaller orders. Vendors including PC Order and Selectica are geared toward handling order management and online product configuration. And suppliers of enterprise application integration (EAI) software are beginning to offer products to more effectively manage a company's work flow. However, bringing these systems together can be a chore.

According to Banker, application integration is one key factor leading a number of vendors to offer broader execution systems. "Mergers and acquisitions are playing a key role in bringing systems together" he says. "Companies hope these broader suites will lessen the pain of integration." Companies that are approaching e-fulfillment through the merged approach include HK Systems and McHugh Software International.

End users are also seeking providers that can target a specific market niche. Through this approach, expertise in traditional warehousing and distribution markets can be applied to key industries. For example, EXE Technologies and Manhattan Associates are strongly targeting the retail/consumer packaged goods markets; AllPoints is bringing its experience in the food industry to online grocers; Yantra's systems target smaller, startup organizations; and HK Systems is looking to capitalize on its distribution strengths.

Peering into the future

How will the Internet shape warehousing operations today, tomorrow and beyond? Banker says this will depend on the approach companies take when working the Web. "Organizations like streamline.com that *deliver* groceries to a person's home will have a limited market," he says. Companies that reinvent themselves will bring in the cash.

One possible model for these new businesses would be existing retailers that offer customers a number of choices. For example, a retailer could offer its customers options including traditional store visits, online ordering with store *pickup*, online ordering with home *delivery* or any combination of these services.

Offering these services would require flexible warehouse systems, capable not only of full pallet *deliveries* to stores, but also small-parcel *delivery* either to retail outlets or directly to the consumer. Fortunately, there are systems out there that can handle these needs--and then some.

"Companies like EXE Technologies are starting to develop solutions for businesses that may not exist yet," Banker says.

Internet retailers will also demand more flexible warehousing options. These companies could own their own warehouses, have manufacturers drop-ship orders directly to consumers or engage the services of a dedicated third-party logistics provider. Again, Banker says work-flow coordination will be key in organizing these disparate sources of goods and data.

Delivering what is promised

To meet the fulfillment needs of online retailers, start-up organizations are corning out of the woodwork to offer these key back-end services. In many cases, these companies are combining Internet order entry and management systems with warehouse software from third parties.

Submitorder.com and Go Figure Technology are two relatively new companies seeking to streamline the electronic order process.

Submitorder.com is establishing a network of partnerships to offer its customers strategic planning, distribution and support services. It can help companies move from developing a Web storefront to managing the shipping process. From its central Ohio distribution center, Submitorder.com can receive inventory from the organization's manufacturers or internal distribution center to fulfill online orders.

Go Figure helps speed order processing for companies conducting B2B e-commerce transactions. It helps Web-enabled companies with financing, warranty, billing, sales and customer support operations.

"Companies spend millions of dollars developing and customizing their Web sites for e-commerce," says Marc Landry, president of Go Figure Technology. "If they aren't functional, and the customer never gets the product, what difference does it make?"

Another way WMS companies are approaching the Web is through ties to established organizations. Optum is in the early stages of developing an alliance with Unisys to *deliver* e-fulfillment solutions that can handle customer *delivery* expectations for goods and services.

The partnership will combine Optum's SCE Series software with Unisys' e-action supply chain services. "(The alliance will enable) companies to handle picking pieces in volume that older fulfillment solutions cannot handle," says Terry Hisey, vice president and general managing principal, Unisys Commercial Market Sector.

What about tradition?

If e-fulfillment is the wave of the future, are traditional warehouse systems doomed to fall by the wayside? Not exactly. Banker says that while many of the emerging B2C relationships are driving new needs, many WMS providers have a good grasp on the needs of organizations engaged in B2B operations.

And even though some analysts axe a bit skeptical of the need for a Web-based interface to a WMS, many vendors still see the value inherent in developing the Web as a tool for real-time inventory visibility.

Why else then would companies like Catalyst International, Provia and Majure Data be putting the time and effort into developing Web-enabled front ends to their software, *scheduled* to be available sometime this year?

There are still some issues that can be solved with "traditional" warehouse systems. Internet-based businesses need a solid foundation, says Paul Crist, Provia Software's vice president of global sales and marketing. "In today's economy, it's not enough for my product to be better than your product. My supply chain has to be better than your supply chain."

WMS vendors that can already handle eaches are putting themselves in an advantageous position.
"As products move from the pick line to the shipping area, tracking becomes more difficult," says Dan Basmajian, senior vice president with Manhattan Associates. "Reduced inventory is battling with an increasing number of SKUs, making it harder to (maintain less) real-time inventory."

Making its mark

Emerging strategies, including e-fulfillment, are helping businesses get products to the consumer on time, in the right quantity and without unauthorized substitutions. The melding of established warehousing/distribution techniques with the ability to handle high volumes of online orders will be what differentiate the winners from the losers on the Net.

Companies make most of Internet connection

Tying the Web into warehouse operations is a good start for establishing strong e-fulfillment operations. However, it shouldn't be seen as the be-all/end-all of e-commerce solutions. Recently, product introductions, contracts and new company start-*ups* have raised the bar when it comes to evaluating electronic operations. Here is a sampling of how users can extend the value of their Internet connections.
On the road again

Shipper.com and others have shown the value of a strong logistics networks to go with warehousing operations. The new USF eLogistics business unit from US-Freightways is focusing its services directly toward online

retailers and manufacturers. The company is using i2's Transportation Manager and USF's WMS integrated with the Internet to provide real-time access to inventory, actual shipping costs and order tracking.

DHL Airways has contracted Syndra to help provide Internet-based transaction services for DHL's customers. The strategic partnership will help improve global e-commerce fulfillment and advanced market planning operations. DHL will add Syntra's Landed Cost Engine as a part of its global logistics services strategy. The engine calculates tariffs, duties and other charges associated with international shipments in real time via the Internet.

GroceryWorks.com, a Dallas-based online grocer, is using *Roadnet* Technologies' Consumer Direct Suite of e-commerce solutions to handle its transportation logistics needs. The system combines the *Roadnet* 5000 routing and *scheduling* software systems and Mobilecast integrated wireless dispatch, tracking and *delivery* system.
ShopLink, an online provider of grocery shopping and household service in the Boston area, is using Descartes Systems Group's e-business home *delivery* solution to transfer its PC-based ordering, planning and *delivery* systems to the Web.

Platform-independent EC service

While many companies chose to focus on moving products, Internet Commerce (ICC) chose to put its efforts into moving data. The company's "B2B4B2C" Web-based order fulfillment service allows Internet retailers and their trading partners to exchange data regardless of technical expertise of platform. The service supports Internet Web forms, Internet fax and traditional electronic data interchange (EDI).

THE WEB'S GROWING INTRICACIES

Web-enabled WMS

* Combines standard warehouse management software with Internet-accessible user front end

* Provides users with real-time inventory visibility
* Integrates with enterprise systems via middleware and/or EAI software))

* Appeals to companies focusing on B2B transactions

* Focuses primarily on operations within a warehouse's four walls

* Facilities remote software installations via the Internet

E-fulfillment system

* Combines online order management; online product configurators; constraint-based, capable-to-promise engines; transportation management and e-fulfillment process management systems

* Ties together Web-entered orders with back-office warehouse, transportation and ancillary systems for supply chain visibility

* Integrates with enterprise systems via middleware and/or EAI software

* Appeals to companies focusing on B2C transactions

* Focuses on enterprise-wide transactions in addition to physical warehouse space

COMPANY DEPARTMENT NAME: Information Technology
PRODUCT NAMES: Public warehousing and storage (422000)
CONCEPT TERMS: Information Technology; Technology application
GEOGRAPHIC NAMES: United States (USA)

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DIALOG(R)File 15:ABI/Inform(R)
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ABSTRACT: In September 1997, Tuscan-Lehigh Dairies implemented RIMMS
(Resources In Motion Management System) routing and *scheduling* software
from Lightstone Group Inc. The vendor is among a handful of companies
specializing in this segment of supply-chain management software. For
Tuscan, that was exactly the piece of its business that needed help. The
company's vision was to automate the routing system to maximize efficiency,
gain an edge in the market, have better customer service, and better
utilization of vehicles. With RIMMS, Tuscan expects to significantly
improve service to its 8,000 customers across 6 states.

TEXT: Headnote:

Maker of routing and *scheduling* software provides solution for growing
segment of supplychain-management software market

Tuscan-Lehigh Dairies used to *schedule* its *deliveries* the oldfashioned
way-with an atlas, maps, and pins. That was until two months ago, when the
company automated the tedious plotting process.

The Lansdale, Pa., dairy went with RIMMS (Resources In Motion Management
System) routing and *scheduling* software from tiny Lightstone Group Inc.
The Mineola, N.Y., vendor is among a handful of companies specializing in
this segment of supply-chain-management software. For Tuscan, that was
exactly the piece of its business that needed help. "Our vision was to
automate the routing system to maximize efficiency, gain an edge in the
market, have better customer service, and better utilization of vehicles,"
says Salim Baltagi, Tuscan-Lehigh's senior director of distribution.

In general, routing and *scheduling* hasn't been well-served by technology
until recently because of the complexity of problem-solving involved.
"There are very few vendors out there. It's wide open and growing at a fast
pace," says Tim Harmon, international program director at Meta Group's U.K.
division.

Harmon estimates the market for routing and *scheduling* software is worth
as much as $150 million and is the second-fastestgrowing sector of
supply-chain-management software, behind only manufacturing production
planning.

With RIMMS, Tuscan expects to significantly improve service to its 8,000
customers across six states, Baltagi says. "A lot of customers have time
windows when you can *deliver*. RIMMS allows us to meet their *schedules*,"
he says. "In our business, with perishable products, it's timecritical."
According to Baltagi, RIMMS also can be reprogrammed to fit the particular

needs of a business. "It's not rigid as other software where you have
parameters that you can't mess with," he says. He expects the package to
eliminate overlapping routes, cut mileage and driver time-and pay for
itself within a year.

(Photograph Omitted)

Captioned as: Route-finder

A typical RIMMS system starts at about $30,000, according to Lightstone. It
includes data from various companies, including Navigation Technologies,
which supplies navigable map databases. RIMMS also incorporates ESRI Inc.'s
Map Objects, a library of software components, and Lightstone's own mapping
software. Users add their own data, such as routes, number of *deliveries*,
and customer requirements. The software then determines which technician to
send and which route is best, plus the best *delivery* time and other
details.

RIMMS is able to quickly handle *pickup* and *delivery* time changes, says
Greg Girard, a senior supplychain analyst at Advanced Manufacturing
Research in Boston. "It can immediately find an address and determine where
to allocate that *pickup* . The ability to handle a dynamic tool is
something the other guys don't have." RIMMS opens up the opportunity to let
the enterprise interoperate with the applications of suppliers, partners,
and customers, he adds.

Other vendors offering specialized routing and *scheduling* products
include Roadshow International Inc., which was acquired this month by
Descartes Systems Group; *Roadnet* Technologies Inc., a division of
United *Parcel* *Service*; and Caps Logistics.

Companies such as Manugistics Inc. in Rockville, Md., offer enterprisewide
application suites that include routing and *scheduling* applications.
Companies sometimes go for big-name vendors without realizing the
implications for their business and then have to turn to companies like
Lightstone that offer more customized solutions, says Tom Gormely, a senior
analyst at Forrester Research in Cambridge, Mass.

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(Table Omitted)

Captioned as: Lightstone Group
THIS IS THE FULL-TEXT.   Copyright CMP Media Inc. 1997
COMPANY NAMES:
Tuscan-Lehigh Dairies
GEOGRAPHIC NAMES: US

DESCRIPTORS: Dairy industry; Supply chains; *Scheduling*; Technological
    planning; Case studies
CLASSIFICATION CODES: 9190 (CN=United States); 8400 (CN=Agricultural
    industries); 5220 (CN=Data processing management); 9110 (CN=Company
    specific)

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DIALOG(R)File   15:ABI/Inform(R)
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ABSTRACT: GeoRoute from Giro Inc. is a graphical software package for the
management of information associated with street networks. The system is an
integration of many years of research and development at the Centre de
recherche sur les transports at the Universite de Montreal. GeoRoute is
unique because it: 1. is based on a street network structure specifically
designed to store and manipulate large networks, and runs on personal and
microcomputers, 2. can handle both node-routing and arc-routing problems,
3. has an automated cartography facility that generates maps from the
database of streets and intersections, and 4. has a flexible route
optimization system, generating routes that can also be graphically
modified by the interactive route editor. GeoRoute has been used in postal
delivery, school transportation, and public works management. It is still
being improved to expand its application span.

TEXT: Routing, *scheduling* and dispatching problems are among the major
components of the activities related to the transportation of goods (or
persons) from the point of production (*pickup*) to the point of *delivery*
(destination). The goal is to provide the best service to the customer at
minimum   cost   to   the   producer. As these two objectives are often
contradictory,   namely   that   better   service   is   more costly, the
transportation enterprise must optimize its resources to find an economical
way to distribute its goods or services while maintaining the goals and
constraints of its marketing strategy.

Physical distribution is intimately related to the other activities of the
enterprise and is a major factor of the price of goods and services.
Kearney (7) has shown that distribution costs represented 16% of the net
value of goods and a quarter of this was incurred by the transportation of
finished   products   from   warehouses   to   clients. Optimization   of
transportation costs is thus a very important economic problem that must
deal with all kinds of characteristics and constraints on route lengths,
vehicle capabilities, working conditions of drivers, *schedules*, and on
types of merchandise. It is generally recognized that optimization
procedures in transportation can reduce *delivery* cost from 10% to 20% and
even more when enterprises solely provide transportation (for example, bus
service authorities, postal services, or couriers).

A great number of algorithms·and methods have been developed for solving
routing and *scheduling* problems but many aspects and constraints have yet
to be taken into account (1). These solutions are almost always heuristic
ones because no efficient algorithms have yet been developed for the sizes
required for practical problems. Solving a routing and *scheduling* problem
involves   many   compromises   within   a   set   of   conflicting goals and

constraints: using the main roads rather than the shortest route, giving a better average service rather than a better overall service. Consequently, the results must be evaluated by hand. This process usually prompts more modifications which in turn must be evaluated.

The sensitive spot in route planning is the design of algorithms, but other activities are also implied: finding the location of the clients, computing the distance between them, evaluating their service time, managing the fleet of vehicles.

When all data is collected and when the objectives are well defined, an appropriate algorithm is run. Finally, the solutions are evaluated and quite often modified to take into account constraints that could not be modeled in the algorithms. Interactive graphics can help in all the steps involved in the planning and implementation of routes (8). The clients and the resources can be more easily registered using graphic input and checked immediately with graphic output because this information usually has geographic components. The evaluation of alternative solutions is also eased because the human eye is very quick at detecting irregularities and discrepancies on a route.

For many years, the Centre de recherche sur les transports de l'Universite de Montreal has been involved in the development of graphic tools combined with operation research methods for dealing with transportation problems. This article describes GeoRoute(TM), a graphical software package for the management of information associated with street networks. This system is an integration of many years of research and development in this area in cooperation with clients.

GeoRoute is unique in several ways:

* It is based on a street network structure specifically designed to store and manipulate large networks and runs on personal and minicomputers (MS-DOS microcomputers and VAX/VMS minicomputer). The network is not in vector or bit-mapped form, but rather is based on an original street network data structure.

* It can handle both node-routing and arc-routing problems.

* It has an automated cartography facility that generates maps from the database of streets and intersections. As the maps are computed from the database information, they can be easily customized and they can be edited using the interactive map editor, also part of the system.

* It has a very flexible route optimization system, generating routes that can also be graphically modified by the interactive route editor.

These features are the modules of GeoRoute that all evolve around the GeoRoute data structure as illustrated in Figure 1 (Figure 1 omitted). They are described in the following sections.

Interactive Network Editor

The Network Editor is a graphics-based tool for the display and manipulation of street networks and associated information. The network is stored as a series of streets, street segments and intersections. Traffic constraints are stored for each segment and intersection as are civic addresses and zone information. A relational database can also be linked with the network to store information that describes the items located on the network. The GeoRoute network structure divides the area into small submaps. These are transparently loaded as needed by the application, using an algorithm similar to the ones used in virtual memory systems. Since the operations performed on a network are of a special nature, we were able to optimize the accesses to the database of regions. This means that the

maximum size of the network manipulated is limited only by the amount of disk space available. Table 1 (Table 1 omitted) presents the sizes of some of the networks already transferred into the GeoRoute network structure. The user is never aware of this division in submaps--all work is done on the whole structure--but as the modifications are usually confined to a small region, display is almost instantaneous.

More Details on the Network Structure

The street network is made up of the following four elements:

1) nodes locations where a link begins or ends

2) links connections between two nodes
3) streets sets of ordered links sharing a common identification

4) link plottings sequences of intermediate points describing the shape of the link. .

As stated earlier, the area covered by a network is divided into rectangular regions, each identified by a unique number. The nodes and links whose locations are in a given region are labeled with the region number. Using a region structure is an efficient way to speed up most of the graphic and search operations, since only the information of the appropriate region needs to be processed.

The street structure itself is created by two lists:

1) the list of links forming a street

2) the list of links connected at a given intersection

Therefore, it is possible to follow a street, link by link, from its beginning to its end, and know which connections are possible in the network.
For location-finding and routing purposes the following information is attached to links:

* the allowed directions of vehicles (one-way or two-way streets)

* the type of vehicles allowed on the link

* the prohibited and penalized turns at both extremities of the link

* a mean speed for vehicles

Depending on the application, other information can be assigned to links and easily maintained by the editor.

The data to construct a GeoRoute database can originate from a variety of sources. Programs have been written to extract and process information from Statistics Canada Area Master Files and U.S. Census Tiger Files. A method has also been developed to generate a street structure in situations where only the nodes and links are available.

Editing the Basic Information
Once the network is created, the network editor is used to modify existing streets, to create new ones and to add information regarding the civic numbers, the postal codes and traffic constraints which include maximum vehicle speed restrictions, one-way streets and prohibited turns. As the network editor displays the street network in graphical form, the user can explore or modify the network using either a keyboard for textual information or the mouse for graphical positioning. Quite often both modes are possible: for example, the location of a client can either be given by

its street address, an intersection or by pointing with the mouse. Even if the user works with a map image, it should be stressed that the network is always stored in the database format and modifications apply to the database. The map image is recomputed from the database, so there is no risk of inconsistency between the map and the database.

The network modification commands can change the structure of the network as shown in Figure 2 (Figure 2 omitted) or update the descriptive information associated with the various elements as in Figure 3 (Figure 3 omitted).

Advantages of Using a Structure Editor

We can see that the main innovation of GeoRoute is the use and manipulation of the structure of the network. This idea is quite new in the geographical information system (GIS) and operations research community. It can be related to the controversy encountered in computer science for the programming language editors (14) where there are advantages in using either the text mode (characters, lines and pages) or the programming mode (expressions, statements and procedures). Even in a text editor such as Emacs (15), which was primarily directed toward dealing with textual entities, there are modes and commands that manipulate higher-level entities. This choice between the visual and structural can also be transposed in our context, but currently the majority of other map editors and GISs use a CAD approach based on drawing maps that are quite difficult to adapt to routing algorithms. For instance, the Intergraph Network Analysis module, SPAN from TYDAC, and few others have optional modules to handle networks. TransCAD from Caliper Corporation has been designed to handle transportation applications. ARCInfo from ESRI also handles networks and produces maps, however the size of the network it can manipulate in the PC environment is quite limited.

In GeoRoute, we were confronted with this trade-off and we designed the system accordingly. Since our group was originally an operations research group, we knew the appropriate structures needed for the algorithms and we developed the street network to fill these requirements. In retrospect, we realize this choice was the right one because it now enables us to build a whole range of applications on this network, such as shortest path calculations, arc-and node-routing optimizations, and address locations.

We want to give a graphic editing capability for this structure, however, this implies that the grapgic representation be recomputed at each display. This module has been finely tuned because the program has to run in the MS-DOS environment where memory space is a scarce resource. The time required to display a map is proportional to the number of links to appear in the window. A one kilometer window on downtown Montreal takes about 10 seconds(1) while the complete network takes up to 12 minutes. An update operation takes a few seconds no matter how large the network. We have shown that it is possible to have a graphic editing of a structural network representation, and the next sections describe some of the currently available applications.

Route Optimization Module

There are two classes of routing problems addressed by GeoRoute: node routing and arc routing. For each, GeoRoute offers a set of general algorithms that can be adapted to specific applications depending on the characteristics of the problem to be solved.
A distinct feature of GeoRoute is the capability to deal with a very detailed street network description transparently divided into smaller regions, as previously described. This implies we had to adapt classical OR algorithms such as shortest paths, or traveling salesman heuristics. As we also deal with permitted turns, one-way streets, U-turns, arriving on the right side of the street, speed limits and user-defined speed/distance

functions, the implementation of the algorithms has become quite complex but all of this information is essential in practical environments for route planning. The system thus produces a detailed manifest for the vehicle driver and enables a precise evaluation of the routes.

Node Routing

In a node-routing problem, the demand is located at the nodes of the network, and solving such a problem is essentially finding a good way of· visiting these nodes using arcs of the network. Examples of applications are postal box servicing, school bus stop *pick*-*ups*, courier services, or *delivery* of goods to multiple locations. For each stop, the user can define the demand size, the service time, service time windows (earliest and latest time that the stop may be served) and whether a U-turn is permitted at that stop.
GeoRoute has defined a very general framework in which almost any conceivable algorithm can be cast; this approach was inspired by the Alto (11) system which is still more general because the end user can even design his or her own algorithms.

In GeoRoute, route generation is divided into four major steps:

1) form initial groups or clusters of stops

2) determine an initial sequence of stops within each cluster

3) exchange stops within each cluster

4) exchange stops between clusters

Steps 3 and 4 can be repeated to improve the final solution. For each step, GeoRoute allows the selection of one or more of several optimization methods. Clusters can either be formed sequentially or by using the Fisher-Jaikumar approach (4). The initial sequence of stops can be determined using either nearest insertion (start with the furthest stop from the depot and then insert the stop that is the closest from any existing stop in the route) or a Clarke and Wright algorithm (2). Stops can be exchanged using either 1-OPT, 2-OPT, 3-OPT (9) or OR-OPT (10) algorithms. A complete solution strategy can thus be tailored to the particular application at hand.

Solving a node-routing problem implies computing the shortest path between each stop which can be precomputed and stored in a distance matrix. At first sight, this problem is a simple application of a classical OR technique (3,5), but in some cases (relay box *delivery* for example) there can be a large number of stops within a small territory, so the characteristics of the network become important (12). In addition, security constraints can require that the stop be serviced only on the right-hand side of the vehicle and U-turns are generally prohibited. Moreover, the movement of vehicles is limited after servicing a stop located at a street corner (see Figure 4) (Figure 4 omitted), and this implies that distance from stop x to stop y may depend on which stop z or z' has been serviced before stop x as shown in Figure 5 (Figure 5 omitted).

When solving a problem, most of the time is spent calculating the distance matrix and improving the original solution. The time required for calculating the distance matrix depends on the distance between the clients and the density of the networks. For a table having 150 entries located in downtown Boston, two hours were required. For a complete distance matrix of Montreal, (i.e., from one link to all other links), 20 minutes by line of the matrix are required. When appropriate, two techniques can be used to reduce calculation time. If the distances are symmetric only the triangular matrix must be calculated. Moreover, in most circumstances, it is sufficient to consider only the nearest neighbors. Improving the original

solution is accomplished using stop exchanges. For routes totaling 100 stops in downtown Boston, the OR-opt algorithm takes about two hours while a 3-OPT procedure could run for about 12 hours. Heuristics have been used to discard subsets of exchanges that do not improve the solution. In addition, a time limit can be specified to restrict the duration of the exchange phase. Furthermore, a recently developed exchange algorithm based on Tabu search method should further improve the performance of the method (6). These times might appear prohibitive, but these calculations can be and are often done during the night and do not slow the solution process. As we will see later, the major part of the time for solving a routing problem is spent in data validation and route evaluation.

Arc Routing

Arc-routing problems consider the cost associated with servicing a street segment. Examples of arc-routing problems include garbage collection, home mail *delivery* , electric meter reading, street sweeping, street inspection, and snow removal. In mail *delivery* for example, the cost function is in relation to the number and type of addresses to be serviced on the segment. This information can be estimated or calculated from data stored in external databases.

Arc-routing problems are particularly difficult and they have received less attention in the past compared with node-routing problems (13). One reason is the need for a very detailed street network, which is usually a huge data entry task. The network editor we described is a great help in that respect. The main difference between arc routing and node routing, described in the preceding section, is that the algorithms must take into account the topology of the network and cannot only use a precomputed distance matrix.

As for node routing, GeoRoute has a general framework for arc routing inspired by the general heuristic of Alto (11). It is composed of basic operators which manipulate objects corresponding to subsets of the network. Three types of objects are identified:

1) arc: a side of a street between two intersections.

2) basic unit: a group of arcs comprising "the other side of the street" for each arc.

3) cycle: a connected group of basic units.

The objects have attributes which provide information for the selection mechanism. The key objects are transportation time (time required to reach an object without servicing any arc) and service time.

The general heuristic has four steps:

1. creating the basic units.

2. grouping these units into cycles.

3. inserting into cycles the basic units that were not inserted in step 2; this is done using recursive exchanges that are a generalization of the usual swapping procedures between two routes.

4. sequencing each cycle by finding a Euler tour with penalties to minimize the number of road crossings and street changes.

The heuristic for solving the Euler tour uses the nearest-neighbor strategy applied to the arc problem at each node next to the closest unselected arc. This strategy is used until all arcs have been inserted into routes. The originality of this general heuristic is its flexibility because it is

parameterized using object selection functions.

Arc-routing problems can often be limited to a small sector of a municipality, such as the territory covered by a postal station. Thus solving a complete problem takes only a few minutes.

Automated Map Production and Edition

GeoRoute automatically generates good quality maps from the information in the network. These maps are recomputed and can be parameterized for each application. Once a user has determined the area for the map, the system extracts the relevant substructure of the network. Then elements to appear on the map are chosen. For example: single or double-line streets, street width, street names, civic addresses, zip codes, one-way information, turn restrictions at intersections, or speed restrictions.

Results computed by our route optimization module (described in the previous section) can also be included on the maps. An example is vehicle routes that include the identification of the clients or the locations to be visited. All or only a subset of the routes defined in the region can be displayed. Other items can be added to the map and positioned with relation to the street network. These are application-dependent and can include such items as bus stops, fire hydrants, postal boxes, or road work in progress. These items are normally stored in a database linked to the GeoRoute system.

The GeoRoute map production facility differs from typical cartography systems in that the map is produced from a database describing the street network. It is not produced from a bit-mapped image file (AutoCad method) or from a description of the map (as are many GIS systems). It is drawn from the coordinates of the nodes and arcs that make up the network. GeoRoute does not have to draw the whole map and then clip the result to keep only the visible portion; it can also customize these maps depending on a full array of parameters. Figure 6 (Figure 6 omitted) shows a map drawn by our system. We can see that the streets are drawn as double lines, the names of the streets are appropriately placed and postal codes are added. The lines with the arrows represent letter carrier routes computed by the route optimization module. All of this information is automatically computed from the link representation of the street network.

When the area to be shown on a map has less than 5,000 links, double-line street maps can be produced. Otherwise single-line street maps are computed. The time required to compute a map is proportional to the quantity of information to be plotted. The example shown in Figure 6 takes less than two minutes to compute, but requires five minutes to plot.

A map editor, built within the Intergraph MicroStation environment, is also available. This map editor offers commands specifically designed to improve the aspects of maps because automatically generated maps have some limitations. One is that they show only the information present in the database while, in some instances, it may be useful to add other features to facilitate the understanding of the map. There may be some overlapping between the graphic objects even though the placement algorithm tries to avoid them.

To help with these situations or to simply improve the esthetics of maps, the map editor offers the following capabilities:

* move the graphic components (symbols, text, lines) of the map

* change the size of the graphic components

* create and edit a legend
* add polygons with special fill pattern to represent lakes, parks, etc.

* reshape the curves of the streets

* add new symbols (train stations, bus stops, airports)

* add routing information (e.g., toll bridges, weight limit on bridges)

Interactive Route Editor

The evaluation of routes computed by the module described in the section on route optimization is most easily done by drawing the routes on the map using the map generation module described in the previous section. Even with sophisticated algorithms, it is almost certain that the routes generated will not be 100% satisfactory and that a few modifications will be required. Some constraints of the problem might be ignored or neglected or special cases will occur. An experienced person (a manager or dispatcher), however, can easily improve these solutions.

GeoRoute provides an interactive route editor to allow the creation, modification and evaluation of routes. The length and other characteristics of the routes are displayed and automatically computed and updated when modifications are made. Commands are available to create or delete routes and to add, delete or transfer stops within a route. It is also possible to modify the path between two stops.

Experience with the System and Related Work

GeoRoute is a spinoff of many years of research at the Centre de recherche sur les transports. These modules have been applied to solve real-life problems in the domains of postal routes, toll phone collection and school bus routes. Together they form a framework which can be customized by Logiroute to new routing applications.

Our experience so far has shown that a major part of the time for solving a routing problem is spent with the client to analyze the data and the solution. Quite often, the original network and the location of the clients must be adapted and the speed functions to transform distances into travel time must be calibrated before acceptable routes can be produced. Overall, computer solution time, even if it takes a few hours that can be done off-line, is small compared to the data validation time. In this respect, the network editor and the mapping subsystem greatly simplify this task. Using the route editor, a transportation manager can evaluate and modify about 25 routes per day; doing this task manually would take up to a week. To our knowledge, there are no other systems that integrate node-and arc-routing algorithms, a network editor and a mapping system that can manipulate large street networks with traffic constraints. Among the most popular routing systems, TruckStops from MicroAnalytic and *Roadnet* from *Roadnet* Technology are relatively low-cost solutions for node problems. They provide the option of using the network, but mainly as a background for the display of the routes. The Logistic Tool Kit from CAPS includes modules for routing and *scheduling* applications, but while it can manipulate networks, it is normally used only to calculate long-haul distances. RoadShow from Routing Technology Software has an interesting feature in its use of video image maps as background for route displays. A network can also be geocoded on the background map.

Routing application software could be built into the Trans CAD environment (Caliper Corporation). RouteSmart from Boone Distinct is such an application for arc-routing problems. This could also be done in ARCInfo (ESRI) environment, and with the MGE Network Analysis for Intergraph, but to our knowledge, it has not been done yet.

Conclusion

GeoRoute is an integration in a microcomputer system of many years of research in the implementation of operations research technology. It has been used in many settings (postal *delivery*, school transportation and public works management) and is still being improved to expand its application span. GeoRoute can deal with applications that require a detailed representation of a street network and is a platform on which specific transportation-related systems can be built. For each application domain, new screens, interfaces to external databases, cost functions and output reports may need to be defined, but the underlying street database, algorithms and map production facilities remain the same.

Acknowledgments

(1)Execution times in this article were obtained on a 16MHz PC
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  5/9/6   (Item 3 from file: 15)
DIALOG(R)File   15:ABI/Inform(R)

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Sorting Out Your Routing Options
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ABSTRACT: In transportation, the problem of designing the most efficient
route through a number of predefined stop-offs is complex because of
"peddle run" *pickup* and *delivery* options that generally require
multiple routes that must be coordinated.   *Roadnet*, a routing and
scheduling program by a *United* *Parcel* *Service* subsidiary called
Roadnet , uses a coordinate system featuring longitude and latitude to
pinpoint the locations of stop-off points based on street addresses. The
user inputs: 1. the point of origin, 2. windows, the times within which
deliveries are to be made, 3. cells, geographic territories in which
experience says customers should be grouped for *delivery* purposes, 4.
relevant product information to the extent necessary for the system to
allocate equipment capacity, 5. vehicle capacity, and 6. order information
for a particular day's *deliveries*.   *Roadnet* offers many options to
assign the day's order to routes. Its real power lies in its ability to
realign routes easily.

COMPANY NAMES:
Roadnet Technologies Inc
GEOGRAPHIC NAMES: US

DESCRIPTORS: Routing; Software packages; Software reviews; Product reviews;
    Distribution; Shipping industry
CLASSIFICATION CODES: 5240 (CN=Software & systems); 8350 (CN=Transportation
    industry); 9120 (CN=Product specific); 9190 (CN=United States)

  5/9/7   (Item 1 from file: 16)
DIALOG(R)File   16:Gale Group PROMT(R)

08589962   Supplier Number: 64788496   (THIS IS THE FULLTEXT)
The Route to E-Retail Success.(ecommerce depends on *delivery* of the
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Fleet Owner, v95, n8, p105
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Document Type: Magazine/Journal; Trade
Word Count: 1763
TEXT:
Taking orders online is relatively easy. *Delivering* them, especially to
retail customers, is the hard part.
     For most emerging e-retailers the difference between profit and loss
lies in covering that "last mile" to the customer's house with maximum
efficiency. Many are content to have package experts such as FedEx, *UPS*,
and regional specialists take responsibility for that last mile. However,

if your products or services don't fit the package carriers' operational
parameters, then the only thing left is to develop your own distribution
network, one that maximizes *delivery* productivity without sabotaging the
convenience and service promised by online retailing.

These days one of the hottest segments in e-retailing is Internet
grocers, companies that hope to replace the neighborhood supermarket with a
browser and *delivery* truck. They offer online access to all of the
products and even some of the services you'd find at a larger supermarket,
and promise to *deliver* those products and services to your door for
little or no additional cost.

While the concept sounds irresistible to anyone who's battled a
Saturday checkout line, successful execution of an Internet grocery
business faces significant hurdles and almost all of them involve trucks
moving that last mile.

First, there's volume. The traditional grocery business is built on
high volumes, and the new online competitors follow the same model.
ShopLink.com, which currently operates two regional online groceries in the
Northeast, says its orders average $95 a week per customer.

Sales of that value and frequency far outstrip those from more
famous e-retailers like Amazon com, but translated into Charmin and Wheat
Chex, they also represent far more volume and far less "density-per-dollar"
than books. Drivers and trucks have to handle multiple bulky packages (Or
totes as they're called by the I-grocers) at every stop rather than a
single, small box.

A significant portion of each order is also perishable, which
requires special handling and driver training. And dropping a *delivery*
behind the screen door won't do it; drivers need to have a secure location
to drop off totes if the customer isn't home.

Along with the high volumes go the grocery industry's traditional
low margins. Although the convenience of online ordering and home
delivery can offset higher costs to a small degree, Internet grocers
still have to remain competitive with traditional supermarkets. And while
they avoid the overhead of retail stores, the new Internet businesses must
still build distribution centers, as well as bear the additional cost of a
delivery operation and fleet.

Demographics also work against I-grocer fleet efficiency. The
primary market for the Internet grocer is the two-earner family, which is
most likely to place a high value on timesaving services. That market is
largely suburban or ex-urban, which means low density.

It also means restrictions on *delivery* windows, since many of
those communities don't welcome trucks early in the morning or late at
night, as well as restrictions on truck size and configuration, since they
have to be able to negotiate residential streets and driveways without
running over bushes or knocking down mailboxes.

And since that market values the service more than the commodities
delivered by that service, *deliveries* have to be accurate, undamaged
and on time to keep customers.

Succeeding as an Internet grocer, then, hinges on developing and
maintaining extremely high levels of fleet productivity within stringent
operational limits.

GOLDEN MILE

Fittingly for an industry created by information technology,
Internet grocers have turned to computerized optimization systems that
provide a good glimpse of the future for most other types of distribution
fleets. At their core, these systems are automated routing applications
like those from Descartes, *Roadnet* Technologies, and MicroAnalytics
currently used by many fleets. But by marrying them to the Internet, these
routing programs reveal their potential as "e-fulfillment systems" with the
power to turn that last mile into a golden mile.

ShopLink currently operates two distribution centers outside of
Boston and New York City, and is building a third to serve the South New
Jersey/Philadelphia area. Eight more centers are planned for the next 12 to
18 months.

Its first two centers operate a total of 50 trucks, most Class 6

Isuzus with 20-ft. dry van bodies, powered liftgates, and GVW ratings just below the CDL level. "We're averaging about 7,000 orders per week, but we can handle up to 10,000 a week with that fleet," says Brad Volez, ShopLink's vice president in charge of its distribution operation.

That works out to an average of 40 *deliveries* per day per truck, which is even more impressive when you consider that they *deliver* within a 50-mi. radius of each warehouse, covering low-density suburbs in Massachusetts, Connecticut and Southern New York and that the average order fills three or four 12 sq.-ft. totes. Customers can place orders up to 2 p.m. on the day before their weekly *scheduled* *delivery*, and for a small additional fee can request next-day *delivery* on nonscheduled days. Unlike some of its competitors, ShopLink does not *schedule* a specific *delivery* slot, but rather makes unattended drops to secure locations such as a garage between 9 a.m. and 9 p.m.

Inventory management and order picking is handled by a warehouse management system (WMS) that relies on product bar codes and portable scanners with wireless communications to ensure that the right item goes in the right tote. "But that system is 'dumb' when it comes to *delivery*," says Volez. "It knows what we have to pick for each order, but it doesn't know how we need those orders to properly load the trucks."

So when a ShopLink customer clicks the "send" button for their weekly groceries, that order does not go directly to the WMS. Instead, it goes to a route optimization system developed by Descartes. The system determines the best routes for each truck and sets an exact *delivery* sequence for each route. Only then is the order passed on to the WMS for picking.

"We get the orders (at the loading docks) in a first-in, last-out sequence," says Volez. The driver is given a printed route for the day, with each stop in a matching sequence. "We require that they adhere strictly to that route and sequence, which eliminates the possibility of leaving the wrong groceries at the wrong house. It also speeds up the *delivery* process.

The 20-ft. bodies only accommodate about 30 to 35 orders, but with the automated route optimization and sequencing, trucks on routes not too far from the warehouse can *pick* *up* and *deliver* another 10 to 15 orders before the 9 p.m. window closes.

"This is a penny business," says Volez. "We don't have the overhead of in-store merchandising, but that last mile adds cost to our business model. It's critical we get that second turn and high *delivery* density per truck. If we don't, our costs increase exponentially.

"Once we hit 400 orders a day, it became apparent that (route) optimization had to be automated to maintain those levels of productivity," he says. "Today (with route optimization), we can assemble all our orders, sequence and route them, and send them for picking in about an hour."

PICK A WINDOW

LazyGrocer.com follows a similar I-grocer model, but with one significant difference: It plans to eliminate unattended *deliveries* by letting customers *schedule* their own narrow *delivery* windows. Again, the key is automated route optimization, although in this case the process starts as soon as a customer logs onto the site to place an order.

The company will open its first distribution facility in Ottawa in October, according to founder and CEO Pierre Bosse. It will have a dedicated fleet of six dry van straight trucks with company drivers making *deliveries* within a 30k radius.

"Optimally, each truck will average 26 orders in a five-hour run and make two turns a day," says Bosse, who projects handling up to 12,000 orders a week out of the Ottawa facility.

When a LazyGrocer customer logs on, a routing and *scheduling* system from Descartes identifies all nearby *deliveries* already *scheduled* within the next seven days. The customer is then free to pick any *delivery* time, but there will be monetary incentives if they choose one that best optimizes fleet productivity, Bosse explains.

Once a day's orders are optimized and routed, the system passes them on for picking and loading.

"Initially, drivers will get a paper route for the day, but we'll move to digital routes with handheld devices and wireless messaging," says Bosse. "We require that someone be home to take *delivery*. With a wireless link, drivers can confirm each *delivery* so a dispatcher can follow their *schedule* and change a route or notify a customer if there's a problem."

Whether they're established names like ShopLink, Web Van and HomeGrocer, or newcomers like LazyGrocer, JennysMarket and H-E-B, Internet grocers understand that the hardest part of e-retailing is *delivering* the goods at a cost that leaves room for profit but still satisfies the demand for flawless service.

Their business does present unique problems, but their reliance on sophisticated routing systems closely integrated with the rest of their distribution chain points the way for service fleets of all types, not just those with .com in their names.

Truck just for I-grocers

Having identified Internet grocers as a viable and growing market, Morgan Corp. has developed a truck body just for that application. Since these trucks spend most of their time in residential neighborhoods, Internet grocers want van bodies that are large enough to handle high order volumes without appearing overwhelming, says Craig Fisher, Morgan vp-marketing.

"They don't want trucks that look bulky," he says." If they're driving through a neighborhood and stopping at someone's front door, they want *delivery* trucks that look good as well as trucks that keep produce fresh and frozen foods frozen."

Among Morgan's suggestions for I-grocer fleets are bodies with lower subframes to cut overall height, and fiberglass fairings that seal cab/body openings for a sleek, aerodynamic look.

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Lightstone:On *Schedule* -- Maker of routing and *scheduling* software provides solution for growing segment of supply-chain-management software market
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Tuscan-Lehigh Dairies used to *schedule* its *deliveries* the old-fashioned way-with an atlas, maps, and pins. That was until two months ago, when the company 'automated the tedious plotting process.

The Lansdale, Pa., dairy went with RIMMS (Resources In Motion Management System) routing and *scheduling* software from tiny Lightstone Group Inc. The Mineola, N.Y., vendor is among a handful of companies

specializing in this segment of supply-chain-management software. For Tuscan, that was exactly the piece of its business that needed help. "Our vision was to automate the routing system to maximize efficiency, gain an edge in the market, have better customer service, and better utilization of vehicles," says Salim Baltagi, Tuscan-Lehigh's senior director of distribution.

In general, routing and *scheduling* hasn't been well-served by technology until recently because of the complexity of problem-solving involved. "There are very few vendors out there. It's wide open and growing at a fast pace," says Tim Harmon, international program director at Meta Group's U.K. division.

Harmon estimates the market for routing and *scheduling* software is worth as much as $150 million and is the second-fastest-growing sector of supply-chain-management software, behind only manufacturing production planning.

With RIMMS, Tuscan expects to significantly improve service to its 8,000 customers across six states, Baltagi says. "A lot of customers have time windows when you can *deliver*. RIMMS allows us to meet their *schedules*," he says. "In our business, with perishable products, it's time- critical." According to Baltagi, RIMMS also can be reprogrammed to fit the particular needs of a business. "It's not rigid as other software where you have parameters that you can't mess with," he says. He expects the package to eliminate overlapping routes, cut mileage and driver time-and pay for itself within a year.

Route-Finder

A typical RIMMS system starts at about $30,000, according to Lightstone. It includes data from various companies, including Navigation Technologies, which supplies navigable map databases. RIMMS also incorporates ESRI Inc.'s Map Objects, a library of software components, and Lightstone's own mapping software. Users add their own data, such as routes, number of *deliveries*, and customer requirements. The software then determines which technician to send and which route is best, plus the best *delivery* time and other details.

RIMMS is able to quickly handle *pickup* and *delivery* time changes, says Greg Girard, a senior supply-chain analyst at Advanced Manufacturing Research in Boston. "It can immediately find an address and determine where to allocate that *pickup*. The ability to handle a dynamic tool is something the other guys don't have." RIMMS opens up the opportunity to let the enterprise interoperate with the applications of suppliers, partners, and customers, he adds.

Other vendors offering specialized routing and *scheduling* products include Roadshow International Inc., which was acquired this month by Descartes Systems Group; *Roadnet* Technologies Inc., a division of *United* *Parcel* *Service*; and Caps Logistics.

Companies such as Manugistics Inc. in Rockville, Md., offer enterprisewide application suites that include routing and *scheduling* applications. Companies sometimes go for big-name vendors without realizing the implications for their business and then have to turn to companies like Lightstone that offer more customized solutions, says Tom Gormely, a senior analyst at Forrester Research in Cambridge, Mass.

Lightstone, founded in 1989 by three people, initially developed the MachUp airline *scheduling* system. That product was sold to American Airlines' Sabre Group. Today, privately held Lightstone has grown to 17 employees and has revenue of nearly $5 million a year.

"We're not generalists," says co-founder and CEO Kenneth Bob. "We have a horizontal technology that focuses on optimizing resources. What is significant is the flexibility of the system and its ability to serve so many industries."

Other Uses

While the RIMMS system is predominantly used for routing vehicles, some customers use it to serve other facets of their business. Pathology Laboratories in Toledo, Ohio, a clinical testing lab that serves physicians, nursing homes, and hospitals, went live with RIMMS three months ago and used it to prepare a bid on a large insurance account.

By entering data about the number and locations of stops under the contract, RIMMS determined how many more cars the lab would need, and how many more miles would be driven each day to service the account-which was potentially worth $250,000 a year and would add as many as 15 staff positions at the lab. "That was essential for us to be able to bid on the account," says Smith. "Prior to RIMMS, we would have guessed. I wouldn't have had concrete data to estimate the cost. We wouldn't have known if it was going to be profitable."

Pathology Labs also uses RIMMS's routing and *scheduling* capabilities for dispatching drivers. Stage one of the routing and *scheduling* project was to restructure routes and create a more efficient system, says Karen Smith, laboratory manager at Pathology Labs. That effort cut courier hours by 19% and mileage by 5%-a total of 60 miles a day. The company was able to eliminate one entire route out of 14.

Stage two, set to begin next month, will identify lower-volume accounts and *schedule* them for just one stop a day. "It'll create efficiency and less mileage," says Smith. Another goal will be to assign route numbers to drivers so they can receive only information that's pertinent to their routes, such as doctor reports and supplies.

A second system is *scheduled* to be in place by January for the lab's house-call division, which provides blood-drawing services to some 45 nursing homes and 100 private customers a day. The system will help dispatch the lab technicians and route them efficiently. "You can't send someone out for eight hours, because you have to bring back the blood," says Smith.

Pathology Labs estimates its initial saving to be $45,000 a year in courier costs alone. "That almost pays for the system, and that's just in stage one," says Smith.

Other Pathology Labs departments are indirectly affected by the RIMMS system. The processing department waits for specimens to arrive, and with RIMMS it can look at the arrival times and spread them out through the day.

Whirlpool Corp. is using RIMMS to centralize management of service technicians at 22 centers. The effort, now being tested, is expected to give a Knoxville, Tenn., dispatcher enough detailed information about any of the field locations and technicians' skills to route them efficiently.

U.S. Computer Group Inc., a Farmingdale, N.Y., computer maintenance field service company, uses RIMMS to deploy technicians. "We need real-time information on technicians and where they are," says Jerry Cogen, VP of business operations. The company has 115 technicians and averages about 300 calls a day.

RIMMS has been tested for six months at U.S. Computer and should go live within three months, Cogen says. The system factors in each technician's skills, as well as their proximity to a particular customer, to make routing decisions. "The computer will be able to decide which is the best fit for the service call," Cogen explains. "It may even tell the customer when their technician will be there and where he is now. We're trying to narrow it down and give the customer an approximate plus or minus an hour or two."

For U.S. Computer and other companies, this new segment of the supply-chain-management software market is providing the means to improve customer service and at the same time save money. "The savings we'll get is tremendous," U.S. Computer's Cogen predicts. "We expect cost saving in routing, tracking the mileage, manpower and efficiency, and reducing manpower in decision making and routing technicians."

Lightstone Group

Headquarters:Mineola, N.Y.

Founded:1989, by Kenneth Bob, CEO; David Lichtenstein, president; and Timothy Peierls, VP of development

Employees:17

Flagship product:RIMMS routing and *scheduling* software

Customers:Tuscan-Lehigh Dairies, Whirlpool, U.S. Computer Group

Data:Lightstone Group

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Greg Valero
     In the grocery supply chain, excessive fleet mileage and high overtime
can significantly increase distribution costs while cutting into the bottom
line. These problems, coupled with inefficient vehicle utilization, missed
customer time windows, and unscheduled last-minute orders create
company-wide problems that may seem impossible to control.
     Today, there is a wide range of computer-based systems available to
wholesalers that support routing, *scheduling*, and tracking functions.
     Truck routing software allows fleet operators to plan efficient routes
and reduce transportation costs through better vehicle utilization and
driver productivity. And when freed from guesswork and unnecessary
paperwork, dispatchers can concentrate on bottom line objectives:
efficiency, driver productivity, and customer service.
     'Dispatchers are sitting there managing large fleets of trucks, but
what's driving their complexity is the product mix is getting more
diverse,' observed Rich Moore, vice president of marketing for Roadshow
International Inc., a provider of map-based route management software for
truck fleets. 'This aspect of their business can't be done manually
anymore.'
     A transportation fleet is a significant cost center for any
distribution company. But it is also an operational area where companies
can achieve significant cost savings through computerization. Marketers of
mobile information systems claim they can reduce transportation expenses by
up to 25 percent for fleets of all sizes. End users can attain cost
reductions in such areas as mileage, fuel consumption, maintenance,
overtime, drivers and vehicles.
     'The biggest savings comes from reduced transportation costs,' said
Dan Basmajian, president, Performance Analysis Corp. 'A truck routing
system can minimize driving distances required to make all *deliveries*.'
     One of the biggest benefits of truck routing software is it helps
dispatchers create efficient routes. Industry experts observe that many
grocery distributors still manually plan their truck routes and *schedules*
for daily *deliveries*.
     This can be both inefficient and expensive, considering that
dispatchers must consider many variables, such as customer time windows,
volume and weight requirements of each load, mileage, and backhauls.

'When you create more efficient routes, you can service customers faster and generally cheaper,' said Michelle Silvers, of Caps Logistics Inc. 'You may lower the amount of time it takes to get products to the customer, or you may be charging them less because you have more efficient routes.'

Truck routing systems consider all the important factors required to develop a route, which can help minimize transportation costs. For example, Caps Logistics offers a software package that analyzes customer time windows and selects the appropriate vehicles and personnel for each route.

The Caps Logistics Toolkit enables users to address various issues, such as facility location, resource allocation, vehicle routing, network analysis, and shipment planning. Clients can add backhauls to routes and interactively update road networks to reflect traffic and weather conditions. It can handle other applications as well, such as pooling and cross docking.

The system gives you an idea about what you should be doing,' Silvers said. 'It helps you look at different factors when you're looking at planning a route.'

In addition, DOT restrictions, weather and traffic conditions can influence the development of a truck route as well. 'A dispatcher needs to keep track of all this,' Roadshow International's Moore said. 'At the same time, he's being pushed by his organization to deal with the most cost effective way to do business. So truck routing software offers a real opportunity for cost savings.'

However, it is imperative for a company to gather and update the necessary data used to develop routes. This represents a major undertaking if a company does not maintain good records.

'That's what the system uses to make its decisions,' Caps Logistics' Silvers said. 'So if the data is not good, a company is not going to get good answers.'

The system presents fleet operators with numerous routing alternatives, allowing them to plan their routes strategically. For example, 'meeting every customer's needs may not be what you want to do,' Roadshow International's Moore said. 'The dispatcher may decide if he misses a customer time window on purpose, he can save a certain amount of money by making the *delivery* one hour later.'

Mobile information systems also allow transportation managers to gain better fleet utilization. The *Roadnet* Computerized Vehicle Routing and *Scheduling* System from *Roadnet* Technologies, a company specializing in transportation and distribution solutions, utilizes the same sophisticated databases, maps, and technology used by *United* *Parcel* *Service*.

The system is designed to improve the router's ability to make cost-effective routing and loading decisions while generating detailed reports that permit cost-control measures and allow accurate expansion planning.

Some of the functions of the *Roadnet* system include computing distances and travel time between *delivery* sites; calculating estimated service time required at *delivery* locations; sequencing the stops within each *delivery* area to create optimum routes; and adjusting sequences to meet customer time windows. It can also create routing alternatives for a variety of circumstances, according to marketing manager Lisa Beck.

This information may lead to the reduction of vehicles by consolidating truck routes and loads. 'For instance, if a company had a fleet of 30 vehicles and can fine tune some routes, maybe it only needs to use 27 vehicles,' Beck said. 'You're also saving money on wear and tear and gas.'

Industry experts say an emerging trend is integrating mobile communications with wireless technology, which offers less-than-truck-load carriers real-time dispatch that can dramatically increase productivity. By combining onboard computers, wireless communications, and routing software, a fleet can meet *delivery* time windows as well as collect and transfer business information to and from customers.

Mobile information system marketers report that a growing number of companies use wireless communications, such as satellite communications

units and specialized mobile radios, to direct the flow of data from shippers to consignees.

There are also hand-held computers and bar code scanners available, which enables drivers to gather data from the customer's location. This information can be transmitted back to the terminal en route so dock managers know the origin and destination of each inbound shipment before it arrives.

Roadshow International offers a software product called Roadshow P&D that integrates computer-based routing with mobile data technology. Since the dispatcher is in constant two-way contact with the driver's mobile data terminal, dispatch decisions can be instantly communicated without interrupting the driver.

'For example, in a wireless environment, a dispatcher may change a driver's *delivery* *schedule* and assign a specific activity to a different driver,' Moore said. 'This data can be sent electronically to a computer located in the truck.'

The instant communication allows Road-show P&D to use the actual *delivery* completion times to anticipate later-in-the-day problems and to alert the dispatcher. Roadshow P&D employs available mobile data networks to integrate the driver's computer and the dispatcher's routing and *scheduling* system into a single, instant-access information system.

Guaranteed Overnight *Delivery*, the South Kearney, NJ-based overnight *delivery* LTL carrier serving 15 states, reports that Roadshow P&D helped the company cut its *delivery* costs by more than 15 percent. 'And now with mobile data, we are seeing even greater savings on the *pickup* side,' stated Mike Irwin, vice president of information technology. 'It gives our P&D operation a real productivity boost.'

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Runnin' ON Data
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By Greg Valero.

Fleets are entering the information highway with a wide range of mobile systems that promise to reduce costs and increase customer service.

The truck routes to grocery and convenience stores are the nation's top food distributors can be impacted by such variables as roadside conditions, vehicle utilization and driver performances.

But wholesalers are avoiding these potential road blocks by entering the information highway--literally--where computer-based mobile information

systems are helping to reduce *delivery* costs and improve customer
service. Industry experts consider the fleet one of the operational areas
in which companies can achieve significant cost savings through
computerization. Marketers of mobile information systems claim they can
reduce transportation cost by up to 25 percent for fleets of all sizes.

That translates into millions of dollars for grocery and convenience
store distributors, a significant savings for an industry already operating
on razor-thin margins.

Based on industry surveys, many grocery distributors still manually
plan their routes and *schedules* for daily *deliveries*. This can be both
inefficient and expensive, considering that dispatchers must consider many
variables, such as customer time windows, volume and weight requirements of
each load, mileage, backhauls, and traffic and weather conditions that may
cause delays.

A wide range of computer-based systems are available to the food
industry to support routing, *scheduling*, and tracking functions. Truck
routing software allows fleet operators to plan efficient routes and
realize monetary savings through better vehicle utilization and driver
productivity. This allows cost reductions in such areas as mileage, fuel
consumption, maintenance, overtime, drivers and vehicles.

But perhaps more importantly, these systems help distributors
deliver products on time and in the right quantity. Otherwise, their
retail customers may find somebody else who can.

Another type of mobile information system is two-way satellite
communications and tracking. Companies can locate their fleets anywhere in
North America and can send and receive messages.

There are systems that also provide automated remote retrieval of
vehicle, trailer, freight, and driver information. These technologies have
great promise for just-in-time *delivery* by facilitating product and load
verification from a mobile platform.

Selecting the right mobile information systems can be difficult,
however, because each offers features to evaluate, benefits to weight, and
prices to compare.

U.S. Distribution Journal spoke with a dozen companies who offer
mobile information systems and related services. The following information
is a roundup of their latest or most successful products applicable for
grocery and c-store distributors:

The TMS-90 inbound traffic management software from Bauer and Gramza
Inc. (see resource list) performs analysis of all inbound purchase orders.
It can pinpoint new revenue potential, automate carrier selection and
assignment, and offers pallet and claims control, carrier and vendor
performance reporting, third-party billing and freight/income sheltering.

The system can snow which POs could have been hauled at a profit and
generates more than 50 management reports that keep end users informed
about traffic backhaul income results. POs are downloaded into the TMS-90
from the mainframe, updated if changed, and automatically posts actual
receiving quantities.

"There are LTL rating programs and truckload rating programs, but none
of them integrates all of that information and offers an inbound system
like we have," said Tom Bauer, a partner at the firm. "You can analyze all
purchase order everyday to find new back-hauling or customer *pickup*
revenue sources."

Third-party or private fleet carrier assignments are made and profit
is calculated automatically as well. It helps consolidate high-profit LTL
shipments and calculate bracket pricing product discounts. The TMS-90 sells
for $24,500, which includes, among others, software, installation, weekend
support and access to upgrades.

The Modular Series 4000 from Cadec Systems Inc. features an onboard
computer, peripheral devices and software applications. The onboard
computer records information from the vehicle (speed, idle and rpm) and
from the driver (delays, *delivery* and *pickup* data), which is later
down-loaded into a personal computer. This information can be used to
eliminate problems, resulting in better response time, more efficient
routing and *scheduling*, and improved customer service.

"It allows information to be shared with the dispatcher via cellular communications," said John R. Quarles, vice president of product planning. "It uses a mobile memory card that allows the transfer of data between the vehicle and dispatcher's office.

The CMS 4000 can enhance vehicle productivity by reducing the amount of over -speeding, over-revving and idling, which lowers fuel and maintenance cost. It constantly monitors engine and driver data and warns drivers who are in danger of violating established driving standards. Drivers save time because all the data they input into the onboard display is recorded and lager printed out for them.

The CMS 4000 costs about $2,000 per vehicle and includes all necessary components for the vehicle and operator, Quarles said. Additional office software is available, starting at about $5,000.

The Caps Logistics Tool kit from Caps Logistics Inc. is a comprehensive software program for truck routing which can reduce a client's total logistics operational costs by eight to 25 percent, according to the company.

The Tool kit helps minimize cost for end users by analyzing customer time windows and selecting the appropriate vehicles and personnel for each route. It also enables users companies to address a variety of issues, such as facility location, resource allocation, vehicle routing, network analysis and shipment planning.

"What distinguishes our software from other packages is we have other applications besides the routing system, such as shipment planning and strategic analysis, which is looking at the whole distribution network," said Michelle Silvers, a Caps Logistics spokesperson.

The Tool kit is capable of managing a variety of product lines. It checks for vehicle and order compatibility and allows companies to add last minute orders to routes. Clients can add backhauls to routes and interactively update road networks to reflect traffic and weather conditions. It also handles other applications, such as pooling and cross docking. The Tool kit costs an average of $65,000, which includes core modules and installation, Silver said. It is customized to meet customer requirements.

The Integrated Fleet/Fuel/Facility Management Systems (IFMS) from Logistics Systems Engineering Inc. is a PC-based system that helps manage daily operations, tactical decisions, and strategic planning of the transportation operation.

The routing component of IFMS is an interactive vehicle management system that develops efficient fleet routes and *scheduling*. By developing optimum routes, the system can balance driver workloads, improve coordination to "just in time" *delivery* windows, and reroute trucks on short notice. IFMS can develop the most cost effective fleet size and service boundaries and provide "what if" alternate route structures for management evaluation.

"It is basically software independent; we have our own application generator which allows the operating people to put up the system without programmers," said president David Warfield. "IT can also be customized at the outset for a customer's unique requirements."

Logistics Systems claims IFMS can reduce a fleet's mileage by about 20 percent and decrease the number of vehicles used from 10 to 20 percent. The base system sells between $40,000 and $60,000 and includes the software and standard reporting, Ware file said.

Manugistics Transportation Planning (MTP) from Manugistics Inc. provides a consistent environment for transportation planning activities, whether it is outbound, back-hauled, or inbound. It also gives a single repository for transportation information, such as shipment requests, carrier and fleet information, plans and *schedules*, carrier commitments, rates and lanes and the like.

MTP consists of three modules: Shipment Planning consolidates loads and selects the best mode of transportation, choosing from private fleet, truckload carriers, LTL carriers and parcel services; Carrier Management extends the Shipment Planning capabilities to select the actual TL or LTL carrier and to track the performance of shippers; and Fleet Management

extends Shipment Planning features by incorporating the shipper's,private fleet operation into the planning process.

"We have multiple service windows per customer, which means you can have different service windows for such products as frozen and perishables," said Tony Cianci, senior account executive. "We also have multiple loading/unloading rates that relate to commodity items."

MTP cost $100,000, which includes the software to handle outbound truck routing and *scheduling*, Ciancei said. Software that handles inbound transportation planning is available for an additional charge.

The OmniTracs system from Qualcomm Inc. is a two-way mobile communications and vehicle tracking system that provides mobile messaging, vehicle positioning and automated data transfers. The Qualcomm Automatic Satellite Position Reporting system provides satellite coverage nationwide and pinpoints vehicle location to within 1,000 feet.

OmniTracs messaging provides as automated link for a variety of data transfer functions. Vehicle-based data such as driver statistics, engine diagnostics and reefer alarms can be forwarded directly to fleet information systems.

Host-based data, such as new load assignments, can be automatically transferred to the truck via an existing dispatch system. Information from driver peripherals, like hand-held computers, can also be transmitted to and from host systems.

"We are a full integration package, which we feed is very important," said Marilyn Jordan, manager of marketing communications. "Some satellite systems offer tracking and mapping, but we offer it all. We feel that data communication is a reliable form of communications. The driver can reference back to it for further instructions."

The OmniTracs system consists of three major elements: vehicle-based hardware, network management systems and application software. It can be leased for $150 a month per vehicle, which includes the hardware and basic messaging fee, Jordan said.

Performance Truck Routing from Performance Analysis Corp. (PAC) is a computerized alternative to the cumbersome manual process of truck touting. PAC claims the system can build master *schedules* and daily *schedules*, and can cut the user's transportation costs by five to 10 percent a year.

The system has the ability to simultaneously consider and constraints, such as mileage, volume and weight of each order, acceptable *delivery* times and days, trailer capacities, driving speeds, single/double driver assignments, DOT regulations, and more.

A master *schedule* of routes, which aids in providing consistent *delivery* to customers, is based on order forecasts. Daily *schedules*, generated from actual demand, can conserve miles while conforming to the master *schedule* or to minimize *delivery* costs.

"Our truck software is the only one that's master *schedule*-based," said vice president John Neblett. "The system uses the client's base *delivery* *schedule* and optimizes vehicle utilization and minimizes the miles to be driven."

For $57,000 a customer can purchase a system that includes the starting license fee, required software and data bases, and installation services, Neblett said.

The *Roadnet* Computerized Vehicle Routing and *Scheduling* System from *Roadnet* Technologies Inc. utilizes the same sophisticated databases, maps and technology used by *United* *Parcel* *Service*, of which *Roadnet* is a subsidiary.

It is designed to improve the router's ability to make cost-effective routing and loading decisions while generating detailed reports that permit cost control measures and allow accurate expansion planning.

"The competition has different maps from the whole country; when they line these maps up, they don't always match," said Lisa Beck, marketing manager. "When we have a person going into the system to do routing, the maps match from state to state and there are no differences in appearances."

Some of the functions of the *Roadnet* system include computing distances and travel time between *delivery* sites; calculating estimated

service time required at *delivery* locations; sequencing the stops within each *delivery* area to create optimum routes; and windows. It can also create routing alternatives for a variety of circumstances.

The cost of the *Roadnet* system varies by end use. But for $18,000 a user receives the software, geocoding, maps, training and maintenance, Beck said. Customers can purchase other modules for additional charges.

Roadshow International Inc. offers a PC-based vehicle routing and *scheduling* system called Roadshow. The Roadshow system is distinguished from competitive routing solutions by its use of full-color commercial maps and an approach to routing and *scheduling* that is based upon actual costs rather than just time mileage.

This cost-based approach reflects real *delivery* expenses and constraints, including times expenses and constraints, including times expenses and constraints, including times customers can and cannot receive shipments, number of vehicles available for *deliveries*, vehicle operating costs, weight requirements, and delays due to traffic conditions.

The system produces complete manifests with depot departure times, order details, and *delivery* time windows. Roadshow enables users to test the results of numerous routing alternatives through "what if" analysis and provides managers with a reliable strategic planning tool. In addition, the company has integrated the Roadshow application with mobile data communications, creating an innovative solution for the LTL marketplace.

"One of the advantages of our system is the management planning component of it," said Lynn Mazur, a Roadshow spokesperson. "It allow you to be more strategic about routing and *scheduling*."

The system costs between $50,000 and $130,000 and includes the software, hardware, installation, training and support services, Mazur said. Pricing is based on fleet size and complexity of the business.

A new version of Rockwell International Corp.'s Pro2000 Mobile Communication System offers total two-way data communications coverage in remote areas of North America and inside buildings in major U.S. metropolitan areas. The Pro2000SL uses both L-band satellite and land-based communication links which provide complete urban capabilities, allowing drivers and dispatchers to reliably exchange messages.

"It allows dispatchers to stay in contact with their drivers, even when they're in metropolitan areas and warehouse loading docks or buildings," said Stan Graff, director of marketing.

The Pro2000SL Multi Mode radio gives Rockwell-equipped fleets reduced communication costs compared to fleets using satellite-only systems. Rockwell claims the system also lowers fleet communication expenses by utilizing lower -cost terrestrial communications versus satellite communications.

Fleet with trucks operating on both long-haul and regional routes will use the Pro2000SL land capability when in cities, while utilizing the satellite capability for their long-haul coverage. In addition, the system uses the Global Positioning System, which provides accurate vehicle positioning. The Pro2000SL costs $4,495, which includes mobile equipment for one vehicle, Graff said.

RoTec's LoadPlanner system is an integrated load building, vehicle routing and load *scheduling* application that provides automatic or user assisted load building, routing and *scheduling* between individual street addresses, cities, and zip codes. LoadPlanner determines the number of required vehicles based on volume, weight unload/*pickup* time, designated time windows, or dock *schedules*.

Miles are computed using an actual road network, allowing for accuracy in building and optimizing the loads into the best driving order. The system also automates the process of locating customers, determines the most cost effective routes, and automatically sequences stop.

"We use actual road miles, taking into consideration road restrictions, like bridge height and commercial vehicles," said product manager Kris Leavitt. "We also take the order information, so our system knows when we have to make *pickups* at various locations and the time frames they have to be done in."

LoadPlanner can be operating on personal computers or incorporated

with existing mainframe and mid-range operating environments. Pricing varies by end use and is based on a tier pricing scheme, Leavitt said.

The R2 (pronounced "R squared") Fleet Management System is a computer software program developed from a joint venture between Ruan Transportation Management Systems and Rockwell International's Highway Transport Electronics Division.

By using raw vehicle and driver operating data gathered from the Rockwell Tripmaster onboard recorder, the system produces management reports that identify sources of inefficiency and low productivity.

Presently, the system is used to analyze miles per gallon and non-driving time, two key areas of fleet efficiency. It can generate control charts that show the average weekly fuel mileage or non-drive time with present control boundaries, based on data from onboard computers.

"If you are a grocery distributor who is trying to improve the miles per gallon on your fleet," said Jack Schang, R2 program manager, "rather than taking conventional spread sheet output that traditionally comes off the Tripmaster, under R2, you can receive a control chart which shows you whether your fleet average is improving or staying the same."

Customers also receive Pareto charts, which indicate, on a "worst" to "best" scale, which drivers are over-speeding and idling their engines without spinning their wheels, Schang said. These charts also rate non-driving or delay time, indicating the type of delay by drivers and customers.

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TEXT:
The vast digital mapping resources that guide the brown vans of *United* *Parcel* *Service* (*UPS*) are now available for IVHS applications. Since September, *Roadnet* Technologies -- which is owned by *UPS* -- has been actively marketing digital mapping products to applications developers and value added resellers (VARs).

Roadnet says it will soon offer seamless coverage of all roads in the U.S., including local streets. It will also offer coverage of all major Canadian roads and the streets in major Canadian metropolitan areas. And with a new map verification system going into use, *Roadnet*'s databases will continually reflect any updates to street and address information obtained at *UPS* operating centers.

Roadnet's positioning as a supplier of navigable databases could have a significant impact on existing map data vendors pursuing IVHS-related business, particularly Etak, Navigation Technologies and Geographic Data Technology.

While competitors are obviously interested in *Roadnet*'s product
plans, existing digital mappers are not necessarily shaking in their shoes
as they face the prospect of head-to- head competition with a deep-pocket
like *UPS*.
    And how does Etak's data, for example, stack up against *Roadnet*'s?
"I haven't examined their data, but I'm sure we will," says Susan Waldorf,
director of map data products at Etak in Menlo Park, Calif.
    Waldorf notes that what she describes as *Roadnet*'s "very low prices"
for its map data will enable *UPS*'s competitors in the package *delivery*
business to easily erase what advantage *UPS* might have had because of its
digitized mapping information.
    With respect to competition in the map data business, Waldorf says her
firm's experience in servicing customers is a distinct competitive
advantage. "Etak's strength is that it has been marketing, selling and
maintaining databases for six or seven years, and we know how to service
our clients."
    "Our clients asks lots of questions after the sale," says Waldorf, who
questions whether *Roadnet* is prepared to support and train its customers
about its database. "Do they have a plan for maintaining and supporting
it?" she asks.
    Roadnet, based in Timonium, Md., was founded in 1983. Since 1984,
Roadnet has provided digital map data as part of the routing and
scheduling systems it markets to commercial *delivery* operations. In
addition to *UPS*, about 500 transportation firms use *Roadnet*'s systems
in the U.S. and Canada.
    UPS purchased *Roadnet* in 1986. The package *delivery* giant got
into the map database business "by default," because it couldn't find the
resources it needed anywhere else, says Mike Jakab, business development
manager at *Roadnet*. Since *UPS* drivers *pick* *up* and *deliver*
packages virtually anywhere, the company -- like any transportation firm --
requires map coverage that's thorough and consistent, he says.
    "Looking at the other data vendors on the market today, we were unable
to find that consistency, and instead found a lot of companies that were
focusing, say, on the top 40 growth areas," he says, apparently alluding to
Etak, which has announced plans to upgrade databases of the 40 largest
metropolitan areas in North America. That observation made *Roadnet* decide
that there's a commercial market for what had previously been an internal
resource. The company has concluded agreements with two resellers --
MapInfo in Troy, N.Y. and Environment Systems Research Institute (ESRI) in
Redlands, Calif.
    Roadnet has started marketing its data for use in other companies'
applications only in the past few months. The firm currently offers
Roadnet Highways -- a database of U.S. Interstates and expressways -- for
$95 per state or $595 for the entire U.S.; *Roadnet* Highways Plus -- which
includes all major U.S. roads plus detailed streets in most major
metropolitan areas -- for $696 per state or $3,995 for the entire U.S.; and
Roadnet County and State Boundary -- which contains county and state
boundary information for the 50 United States and the District of Columbia
-- at $75 per state or $395 for the entire U.S.
    Roadnet plans to introduce its Canadian Highways product in the
first quarter of next year. Another product providing five-digit ZIP code
boundary information for the U.S. is due in April. In June, the company
plans to release *Roadnet* City Streets, the seamless database which it
says will provide detailed street information for the entire U.S. City
Streets will include data on one way streets, turning restrictions,
overpasses and underpasses "for selected areas around the country," says
Andy Dotterweich, division manager of database development at *Roadnet*.
    When adding that sort of information, which is necessary for vehicle
navigation and route guidance applications, *Roadnet* doesn't focus
specifically on large metropolitan areas. Its strategy has been driven, at
least so far, by the needs of its parent company. When the area served by a
UPS center grows or shrinks significantly -- as new subdivisions open, or
as people and/or businesses desert an area -- *UPS* re-engineers the
drivers' routes to make them more efficient. As part of that process,

industrial engineers conduct a thorough field verification. This includes capturing data on driving restrictions and physical features such as overpasses, Dotterweich says.

"We realize that the commercial market is not very interested in our centers. They're interested in a county or an MSA (metropolitan statistical area)," says Jakab. Now that the company is marketing its databases for use in other applications, it's putting more emphasis on enhancing its data in areas that make sense for other customers. When *UPS* conducts a field verification for more than one center in the same area, for example, "we're attempting to complete the entire county as well," he says.

Among the tools used by the field verification teams is a software program that allows an engineer to enter updated information on a laptop computer. This tool was developed to capture detailed street address information, plus data on driving restrictions. "But we recognize that it's going to take quite a while to do that for the entire country. And we would like to have a nationwide street database sooner than that," Dotterweich says.

Roadnet recently developed a new version of the system, Map Verification Tool (MVT) 3.0, which captures street and address information the *UPS* centers keep in text format, and converts it to map database format. Dotterweich describes the "textual listings" *UPS* uses to store address information as the company's version of the U.S. Postal Service's ZIP+4 codes. These listings describe the way packages are sorted and drivers make *deliveries* on their routes. As new buildings go up, and people occupying those buildings require *deliveries* from *UPS*, their addresses are added to the database. Using MVT 3.0, they will be added quickly to the map database as well.

"It will be a great enhancement for providing new street information, which everyone wants, and it also incorporates new address information, which everyone also wants," Jakab says. MVT 3.0 won't, however, streamline *Roadnet*'s ability to capture information on driving restrictions. "That, we've only figured out one way so far how to do" -- by actually driving the streets, he says.

"We currently have many teams driving the streets," Dotterweich says.

Although *Roadnet* has announced a June *delivery* date for City Streets, it already sells detailed street information through its routing and *scheduling* products, and some of the new data will be available to resellers as soon as mid- January, Jakab says. The entire U.S. database won't be available before June because much of City Streets is based on the U.S. Census Bureau's TIGER '92 data, and not all of that has been released, he says.

One of the things that officials at *Roadnet* say will be unique about City Streets is that it provides seamless connectivity across the U.S. It will allow a user, for example, to plot a route from a specific address in Baltimore to a specific address in San Francisco, Dotterweich says.

A problem inherent in the TIGER '92 data is that when a road meets a county line, it often isn't picked up correctly in the map for the next county, Jakab says. Sometimes a segment of the road near the border seems to be missing; sometimes the segments in the two counties appear not to meet. *Roadnet* has corrected those discrepancies, he says. "So you can pan across the map and it's seamless. And for transportation, that's very, very important, because you can't do that pathfinding until you've completed that process."

TEXT:

UPS'S USP

John Alden agrees that calibrating the depth of *delivery* drivers'
pockets so that they don't have to dig too deeply for loose change might
seem on the fussy side. But it's not out of the way at US carrier United
Parcel Services. The company may run a fleet of aircraft and a massive
computer network, clock up turnover of $11 billion and spend $1.4 billion
on new investment every year: but downhome managers proudly boast that they
measure costs in tenths of a cent and can predict within five or six
minutes how long a driver will take on his 100-mile *delivery* and *pick*-
up round every day. `We measure everything,' says Alden, 47, senior vice
president for business development. `I think we're probably the most highly
industrially engineered company in the world.'

There's method in *UPS*'s measurements. As Alden notes, if all of its
50,000 US drivers took an extra minute to socialize with customers as they
delivered their 5 million daily packages, `that's very big bucks'. But
it's not only an issue of cost. Through such attention to detail as
measuring pockets, designating the right fingers to hold a key or making
truck seats easier to slide in and out of, *UPS* has acquired an enviable
reputation for reliability. After 80 years it *delivers* to more US
addresses than the US Post Office and picks up Fortune's `Most admired
transportation company' title as regularly as a consignment of parcels.
`The basic testimonial is our size,' says one local manager. `We wouldn't
have gotten to be the biggest parcels carrier in the world if our customers
hadn't agreed.'

UPS's upright brown vans with their uniformed drivers are
ubiquitous in the US, as reassuringly American as MacDonalds or the Empire
State Building. The US is still *UPS*'s heart and home. But spurred into
international action by pushy competitors such as Federal Express, DHL and
TNT, the company is currently in the middle of an ambitious push to go
global. The ultimate aim: nothing less than to be able to *pick* *up* and
deliver a package at any address on the globe. According to vice chairman
Oz Nelson: `We're trying to bring the *UPS* package car [*UPS*-speak for
delivery van], bike or motor bike to every country in the world.'

This has meant some changes of attitude at *UPS*'s unostentatious
Connecticut headquarters. Low-profile executives have traditionally
preferred to let the talking be done by the homely drivers and office staff
who dominate corporate mythology. Now top managers are themselves standing
up to emphasize the latest proprietary information technology and
automation systems. Examples include an integrated international tracking
and shipping system which interfaces with customs as well as customers'
computers, and an electronic clipboard for the package car cab. For the
first time in its history, *UPS* has launched TV advertising in the US, and
is in the middle of a worldwide press campaign under the message: `As sure
as taking it there yourself.'

For a conservative firm which has long stressed the virtues of
patience and thrift, *UPS* has also been showing an aggressive turn of
speed. At the same time as building one of the 10 largest US airlines from
scratch in a year, it has been spending freely on foreign acquisitions in

order to expand its international network more than four-fold from 41
countries to 175. *UPS* `is pouring money' into the viciously competitive
international business, says Nelson, who admits that it is anticipated to
be three years before the international side makes any money. `But if we
didn't expand internationally, we couldn't protect our domestic customer
base.'

As *UPS* races to *deliver* its global package, however, it can rely
on deep-rooted reserves of strength. From its origins in 1907, founder
James E. Casey insisted that the company should be 'owned by its managers
and managed by its owners'. All *UPS* stock is held by 18,000 managers,
from supervisor level upward, who must sell back their holdings after they
retire. The share price is calculated quarterly by the directors, and
holdings accumulate annually. One important consequence: *UPS*'s behaviour
is not constrained by the short-term preoccupations of brokers on Wall
Street. This means that managers can embark on long-term projects - such as
the international network or a gigantic $250 million air hub at Louisville,
Kentucky - without looking over their shoulders for corporate raiders.

Over time, this `managerial socialism' has also allowed the company
to build impressive financial clout. With net profits of $750 million last
year and a triple A credit rating, *UPS* is bigger and stronger financially
than international rivals. It is therefore much better cushioned to
withstand several years of competitive losses on the international package
business, as well as the expensive task of building up national ground
networks outside North America. For the last three years, *UPS* has been
investing around $1 billion annually from its own cash flow.

The second important *UPS* strength is employee stability. As a
labour-intensive business - total workforce is 230,000 - it depends
crucially on attracting and retaining people who enjoy the company's
service claims and its demanding culture. Although they are well paid and
unionized, the company doesn't buy its strong staff loyalty with
lavishness. Offices are plain, and even the most senior managers don't have
private secretaries. Drivers are responsible for checking and washing their
cars every day.

The attraction is rather an ethic that valorizes hard work, frugality
and a tidy appearance. `Smile? Hair cut? Clothes pressed? Shoes shined?
Shaved? enquires a notice in the men's room at *UPS*' Connecticut
headquarters. Posters reading `United we care - united we care' and
`Packages are our paychecks - handle with care' exhort drivers and sorters
at operating centres to do their best. Fanatical maintenance means that
UPS's custom built package cars have an average service life of 22 years.
UPS is not at all abashed by a former chairman's description of its
mystique as a cross between the Marines and a Quaker meeting.

The company's grey-suited, short-back-and-sides managers may be
lacking in flamboyance, but they certainly don't fall down on knowledge of
the job. All the top men have been with *UPS* their entire working life,
`99% of them' starting as drivers or in lowly clerical positions. The
company never hunts outside except for specialists such as computer or
airline staff. Drivers too are remarkably loyal. Feted as company heroes,
cosseted with constant ergonomic improvements to their cars, they are
constantly made aware that they are *UPS*'s front line. Many climb along an
established career path to positions of power - the current chairman, John
Rogers, who recently announced his retirement next year, did time on the
road. Others are content to do their rounds for up to 25 years.

Part of this success is down to *UPS*'s trick of catching its
recruits young. It makes a virtue out of necessity by employing around
40,000 US university students in part-time jobs at sorting centres around
the country. Some don't take to the company's particular brand of Victorian
ethic. Those who do reinforce it by joining up after graduating and working
their way up the corporate ladder. `It takes a certain type of person to
work for this company,' confirms a business partner who works closely with
UPSers. `I never met a *UPS* manager who didn't have that long-term view.'

The final plank in *UPS*'s strong foundation is its huge customer
base. Over 82 years *UPS* has patiently accumulated almost 1 million
regular daily US customers who know that the company doesn't tailor prices

or service for short-term results. The resulting consistent volumes have allowed the company to plan its long-term facilities well ahead. According to Nelson, `We've read lots of textbooks on pricing, and we disobey all of them.' Instead of setting rates by what customers would pay, Casey insisted that *UPS* (motto: `Best Service and Lowest Rates') start from its meticulously measured present and future costs and then add a modest markup. Since *UPS* won't match tactical deep discounts. its rates aren't the lowest in every case, although they often are. Either way, says Nelson. `The customer always knows it's an honest price.'

Casey's remarkable culture has so far held the company together through three distinct phases of growth. *UPS* began life as the American Message Service in 1907 in Seattle, where a handful of teenagers *delivered* hot meals to hotels and ran messages from the one telephone in town. Package *delivery* for local stores soon came to be the business's mainstay, and the consolidation of retail *deliveries* fuelled the company's steady growth, now under the *UPS* name, on the West and East coasts up to the early 1950s.

By then the rise of the automobile and the building of suburban shopping malls was signalling the impending demise of the contract retail *delivery* era. So *UPS* started courting manufacturers rather than stores. To meet their needs it had to go head to head with the US Postal Service, becoming a common carrier able to *deliver* packages to and from anyone anywhere in the US. It took *UPS* 30 years to acquire the rights to serve all the states of the union. The company boasts that it is still the only agency (including the Post Office) to provide service to every address in the US.

The steady development of the domestic customer base has been overlapped by the third era: that of the international and air networks. Although it had been flying domestically since the 1950s, *UPS* had ignored the strategic implication of taking to the air. Eyes fixed firmly on the road, it didn't react to the important developments in the airlines until the early 1980s. Now it had to recognise that by exploiting the jet aircraft's ability to shrink time and space, entrepreneurial outfits such as Federal Express and DHL had taken a giant competitive leap ahead, offering new strategic services - such as express and international *deliveries* - which a ground carrier couldn't hope to match.

Although it was belated, the vertical takeoff of *UPS*'s domestic overnight air *delivery* service in 1982 has left even its own managers startled. `Air services took off so fast that we disbanded our diversification group,' says Nelson. To start with, *UPS* packages went by *scheduled* passenger airlines. When that was no longer enough to cope with the volume of packages, it bought its own planes and hired other operators to run them. By 1987 the headaches of coordinating four independent operating companies persuaded *UPS* to take the drastic step of becoming an airline in its own right.

Within a year it had hired mechanics and pilots, bought simulators and completed the arduous process of airline certification. The shipper now has a fleet of 99 owned aircraft, including six converted Boeing 747s and 15 specially-designed 757s, while another 15 757s are on order. *UPS* has just opened a second massive air hub in Philadelphia.

If the overnight air business has grown faster and more profitably than anyone predicted - last year it generated $2.2 billion in turnover and $350 million in profits - investment costs have caused a sharp corporate intake of breath. `If we'd known how much it would take, we might not have done it at all,' marvels Nelson as he surveys the multi-billion seven-year outlay. `We'd have missed a real success story.'

UPS has also been sprinting to catch up with its hightech rivals in the international arena. Beginning its foreign expansion with ground operations in Canada and Germany, the company waited till 1985 to launch an international air link between the US and Europe. Since then it has expanded the service no less than five times, and in August 1989, after nine quick-fire acquisitions in Europe and the Far east, it claimed a near worldwide package and document service. The biggest blank spots in the *UPS* 175-country network were in Eastern Europe - but *UPS* is working on

that too: Hungary went brown in September. `We're in a hurry,' admits Nelson. `There are advantages in being first, which *UPS* hasn't had too often. But now we think we have the biggest international network in the world.'

UPS isn't planning to slow down any time yet. The globalisation of markets, the burgeoning of the Pacific Rim and glasnost in the East all underwrite the prospect of a continuing 30% annual growth rate in the international business, while new technology helps to keep costs under control. On the immediate agenda: 1992, and a plan to build up a pan-European ground network around the existing 12-year-old base in Germany. *UPS* is about to launch a pilot run between Germany and Italy, via the non-EC Switzerland. Now the carrier is keen to find sizeable British, Spanish and French acquisitions to provide European bulk.

Further ahead is the complete `on call' worldwide door-to-door *delivery* service. Such a comprehensive network, says Don Layden, senior vice president for international operations, `will provide a variety of service opportunities' for the low-cost producer which *UPS* aims to remain. For instance, in these days of tight inventories and lean manufacturing, the company sees itself as the ideal just-in-time *delivery* partner. `We should be in the worldwide distribution business. We should be able to go into a business, analyse its needs and provide a whole system,' says Layden. That will depend, though, not just on the steady build-up of *UPS*'s own capabilities. It will also need a matching response on the part of customs to speed packages on their way. Europe, where *UPS* is lobbying hard, is likely to be a useful test case for these ambitions.

So far, *UPS* has scarcely put a foot wrong in its rush to catch the international post. Its deep pockets and well-tried managerial resources certainly win the respect of competitors. Yet the headlong expansion still prompts a few questions. First, will the all-important *UPS* culture be compromised by the intake of outsiders such as computer and airline folk, not all as egalitarian and sub fusc as the men from Connecticut? And how will individualistic European drivers, for example, take to the rigours of *UPS* work study?

Already answered, reply confident UPSers. Running computers and aircraft, they point out, requires precision just as much as does running a fleet of package cars. There are no reports of culture-shock at the *Roadnet* Technologies software subsidiary, acquired a few years ago. As to recalcitrant Europeans, Layden notes that on the management side the recently acquired Continental teams are substantially intact, and that there are now only a very few expatriate Americans in Germany. *UPS*, conceded Layden, `learned some things' in Germany and Canada, where `we had to change a few flavours'. Germany, where following limited deregulation *UPS* has launched a premium letter service, is now profitable. On that basis, he says, `we don't anticipate problems in the rest of Europe'.

A second challenge is the tough battle for global capacity among a quartet of powerful contenders, best illustrated by the takeover vicissitudes of the last couple of years. First *UPS* sniffed around Flying Tiger, an established operator whose aircraft *UPS* was using for important strategic routes to Tokyo, Hong Kong and Singapore. On closer consideration, it thought better of assuming Tiger's reported $800 million of debt, only to see mortal rival Federal Express step in to buy the company earlier this year. Understandably less than keen to use its competitor's services, *UPS* now must find new ways to the Far East in a hurry.

UPS also tried to buy DHL, which handles over half the US-bound express international business and may currently be the only profitable international operator. Price and `legal factors' scuppered a deal with DHL, which remains a potent rival. But *UPS* managers are philosophical. Despite immediate hitches in acquiring routes, they point out that the fastest-growing part of the business is packages, which is *UPS*'s traditional strength. The recent growth in letters and documents, which has fuelled rivals' takeoff, may fall away in the medium term, as the use of fax and electronic mail continues to increase. `We'll grow faster than less focused competitors.' promises Nelson. `I think that in the future you'll

see that the big four will be there. But FedEx and *UPS* will give the
other two a run for their money.'

Rather than an assault on its existing business, *UPS* sees
electronic information services as a possible supplement. `I feel sure
we're backing into information services,' says Nelson.

One possibility is electronic data transfer. Nelson instances
another: *UPS*'s programme to draw up a computerised address map of every
location in the US, to be used for on-line routing of drivers to *pick*
up parcels. `That'll be something no one else has,' he says. `In this way
as we invent things that we need, we may well be able to market them to
other people.'

But *UPS*'s level-headed managers aren't about to be dazzled by the
glamour of aviation or information technology out of the time-honoured
preoccupations with squeezing the most out of its fundamental assets.
`There wouldn't be an air network at all if there wasn't this massive
system on the ground,' says a local manager, proudly surveying a fleet of
spotless cars, engines purring and headlights blazing, as they prepare to
leave the depot on their regular rounds.

The 1990s high tech is just the latest avatar of the company's
original obsession with engineering the hell out of *delivery* times. *UPS*
boasts of inventing a mechanical sorting wheel back in 1919 and the hub
and spoke concept for its operating centres, in addition to innumerable
smaller ways of making *deliveries* easier and faster. These days the tools
it employs are likely to be electronic: address mapping, mobile computers,
the computerised customs interface.

Upcoming are robotic load and sorting (intended less to cut headcount
than to meet a projected labour shortage), and a `dense code' computerized
label which will eventually allow the company to track every one of its
packages throughout the length of its trip. But the corporate heartbeat is
still the industrial engineers' stopwatch, tracking *UPS*'s growth in
sorting bays and on *delivery* rounds by seconds and cents.

PHOTO : John Rogers, current chairman of *UPS*, did time on the road
like most of the other managers within the company. The career path from
driver to position of power is a well established option

PHOTO : According to vice chairman Oz Nelson: `We're trying to bring
the *UPS* *delivery* van to every country in the world.' Once a US carrier
only, it now reaches 175 nations worldwide

PHOTO : Senior VP for business development John Alden thinks *UPS* is
`the most highly industrially engineered company in the world'. Its
high-tech innovations include a computerised address map

PHOTO : Senior vice president for international operations Don Layden
hopes to achieve a worldwide door-to-door *delivery* service in years to
come. Cooperation from Customs would be needed
CAPTIONS: John Rogers. (portrait)

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ABSTRACT: A transportation fleet is a major cost center for any distribution company. Excessive fleet mileage and overtime can cause distribution costs to rise and reduce profits. Inefficient vehicle utilization and unscheduled last-minute orders could make the situation seem uncontrollable. Truck routing software is available to wholesalers which can help them in managing routing, *scheduling* and tracking.

TEXT:
   Mobile information systems allow fleet operators to plan efficient routes and reduce transportation costs through better vehicle utilization and driver productivity.
   In the grocery supply chain, excessive fleet mileage and high overtime can significantly increase distribution costs while cutting into the bottom line. These problems, coupled with inefficient vehicle utilization, missed customer time windows, and unscheduled last-minute orders create company-wide problems that may seem impossible to control.
   Today, there is a wide range of computer-based systems available to wholesalers that support routing, *scheduling*, and tracking functions.
   Truck routing software allows fleet operators to plan efficient routes and reduce transportation costs through better vehicle utilization and driver productivity. And when freed from guesswork and unnecessary paperwork, dispatchers can concentrate on bottom line objectives: efficiency, driver productivity, and customer service.
   "Dispatchers are sitting there managing large fleets of trucks, but what's driving their complexity is the product mix is getting more diverse," observed Rich Moore, vice president of marketing for Roadshow International Inc., a provider of map-based route management software for truck fleets. "This aspect of their business can't be done manually anymore."
   A transportation fleet is a significant cost center for any distribution company. But it is also an operational area where companies can achieve significant cost savings through computerization. Marketers of mobile information systems claim they can reduce transportation expenses by up to 25 percent for fleets of all sizes. End users can attain cost reductions in such areas as mileage, fuel consumption, maintenance, overtime, drivers and vehicles.
   "The biggest savings comes from reduced transportation costs," said Dan Basmajian, president, Performance Analysis Corp. "A truck routing system can minimize driving distances required to make all *deliveries*."
   Create Efficient Routes
   One of the biggest benefits of truck routing software is it helps dispatchers create efficient routes. Industry experts observe that many grocery distributors still manually plan their truck routes and *schedules* for daily *deliveries*.
   This can be both inefficient and expensive, considering that dispatchers must consider many variables, such as customer time windows, volume and weight requirements of each load, mileage, and backhauls.
   "When you create more efficient routes, you can service customers faster and generally cheaper," said Michelle Silvers, of Caps Logistics Inc. "You may lower the amount of time it takes to get products to the customer, or you may be charging them less because you have more efficient routes."
   Truck routing systems consider all the important factors required to develop a route, which can help minimize transportation costs. For example, Caps Logistics offers a software package that analyzes customer time windows and selects the appropriate vehicles and personnel for each route.
   The Caps Logistics Toolkit enables users to address various issues, such as facility location, resource allocation, vehicle routing, network analysis, and shipment planning. Clients can add backhauls to routes and interactively update road networks to reflect traffic and weather conditions. It can handle other applications as well, such as pooling and cross docking.

The system gives you an idea about what you should be doing," Silvers said. "It helps you look at different factors when you're looking at planning a route."

In addition, DOT restrictions, weather and traffic conditions can influence the development of a truck route as well. "A dispatcher needs to keep track of all this," Roadshow International's Moore said. "At the same time, he's being pushed by his organization to deal with the most cost effective way to do business. So truck routing software offers a real opportunity for cost savings."

However, it is imperative for a company to gather and update the necessary data used to develop routes. This represents a major undertaking if a company does not maintain good records.

"That's what the system uses to make its decisions," Caps Logistics' Silvers said. "So if the data is not good, a company is not going to get good answers."

The system presents fleet operators with numerous routing alternatives, allowing them to plan their routes strategically. For example, "meeting every customer's needs may not be what you want to do," Roadshow International's Moore said. "The dispatcher may decide if he misses a customer time window on purpose, he can save a certain amount of money by making the *delivery* one hour later."

Mobile information systems also allow transportation managers to gain better fleet utilization. The *Roadnet* Computerized Vehicle Routing and *Scheduling* System from *Roadnet* Technologies, a company specializing in transportation and distribution solutions, utilizes the same sophisticated databases, maps, and technology used by *United* *Parcel* *Service*.

The system is designed to improve the router's ability to make cost-effective routing and loading decisions while generating detailed reports that permit cost-control measures and allow accurate expansion planning.

Some of the functions of the *Roadnet* system include computing distances and travel time between *delivery* sites; calculating estimated service time required at *delivery* locations; sequencing the stops within each *delivery* area to create optimum routes; and adjusting sequences to meet customer time windows. It can also create routing alternatives for a variety of circumstances, according to marketing manager Lisa Beck.

This information may lead to the reduction of vehicles by consolidating truck routes and loads. "For instance, if a company had a fleet of 30 vehicles and can fine tune some routes, maybe it only needs to use 27 vehicles," Beck said. "You're also saving money on wear and tear and gas."

Technological Developments

Industry experts say an emerging trend is integrating mobile communications with wireless technology, which offers less-than-truck-load carriers real-time dispatch that can dramatically increase productivity. By combining onboard computers, wireless communications, and routing software, a fleet can meet *delivery* time windows as well as collect and transfer business information to and from customers.

Mobile information system marketers report that a growing number of companies use wireless communications, such as satellite communications units and specialized mobile radios, to direct the flow of data from shippers to consignees.

There are also hand-held computers and bar code scanners available, which enables drivers to gather data from the customer's location. This information can be transmitted back to the terminal en route so dock managers know the origin and destination of each inbound shipment before it arrives.

Roadshow International offers a software product called Roadshow P&D that integrates computer-based routing with mobile data technology. Since the dispatcher is in constant two-way contact with the driver's mobile data terminal, dispatch decisions can be instantly communicated without interrupting the driver.

"For example, in a wireless environment, a dispatcher may change a driver's *delivery* *schedule* and assign a specific activity to a

different driver," Moore said. "This data can be sent electronically to a computer located in the truck."

The instant communication allows Roadshow P&D to use the actual *delivery* completion times to anticipate later-in-the-day problems and to alert the dispatcher. Roadshow P&D employs available mobile data networks to integrate the driver's computer and the dispatcher's routing and *scheduling* system into a single, instant-access information system.

Guaranteed Overnight *Delivery*, the South Kearney, NJ-based overnight *delivery* LTL carrier serving 15 states, reports that Roadshow P&D helped the company cut its *delivery* costs by more than 15 percent. "And now with mobile data, we are seeing even greater savings on the *pickup* side," stated Mike Irwin, vice president of information technology. "It gives our P&D operation a real productivity boost."

RELATED ARTICLE: CASE STUDIES

AWG Improves Cube Utilization

Maxing out a truck fleet's cube utilization can yield big savings for distribution firms.

A case in point is Associated Wholesale Grocers Inc., a wholesale grocery co-op that operates an 800,000-square-foot facility in Kansas City, KS. The distributor services customers within a 300 mile radius, a territory that spans across parts of Iowa, Kansas, Missouri, and Nebraska. AWG ships 130 loads per night and operates 186 refrigerated trailers, 40 drive trailers, and 89 tractors.

In June 1994, the distributor specified the Roadshow truck routing and *scheduling* system for its Kansas City facility. Prior to implementing the system, Associated Wholesale planned its routes primarily through manual tabulation.

"Roadshow is able to take existing data and tabulate the correct shipping weights and cube utilizations based upon existing equipment in a much more efficient manner than the human mind was able to do," observed Michael Frank, vice president of distribution. "As a result of that, we found greater cube utilizations and higher weight utilization per trailer, which gave us fewer outbound loads."

Frank estimates Roadshow saved the company $780,000 in transportation costs during the first year of implementation. AWG lowered its outbound transportation expenses by six percent; increased payloads by 11 percent; and reduced the number of drivers by six percent. "That's a big savings that actually exceeded our expectations," he said.

The routing system enables the wholesaler to manage its orders and *deliveries* more efficiently, Frank said. The system can provide outbound and anticipated backhauling information, which dispatchers can use to design the most effective routes.

"Roadshow offered us the most flexibility to continue to do the business in the basic manner in which we are accustomed to," Frank said. "Yet at the same time, it gave us enough openings and enough data to improve the efficiency in the way we were doing business."

In addition, AWG reports the system helped the company decrease order processing time, which previously took six hours.

"Our of that six-hour cycle, two hours were used to assign orders to routes," Frank said. "Now that two hour time period takes roughly 45 minutes. It doesn't sound like much, but the idea of getting orders to the floor an hour earlier is pretty important." - G.V.

RELATED ARTICLE: GFS Toolkit To Locate DC

Trying to figure out where your next distribution center should be located? A truck routing system can help.

During the past five years, Gordon Food Service, a distributor of food products for restaurants, hospitals, schools and other institutions, expanded its case growth rapidly and consistently. The Grand Rapids, MI-based company operates three distribution centers which service approximately 17,000 customers in Michigan and surrounding states with some 1,300 products.

In planning its future distribution requirements, the GFS logistics team selected the Caps Logistics Toolkit for help.

"We selected the Toolkit to resolve a distribution network planning

(or DNP) problem, specifically, the location of a new DC," said Scott
Hicks, systems analyst. "We evaluated the leading suppliers of DNP decision
support software and chose the Toolkit based on its flexibility, value and
potential."
    Caps Logistics created a strategic planning system for GFS. This
customized system contains distribution and demand points, as well as
transshipment points, which GFS refers to as "drop points." The system
enables GFS to optimize product movements over its distribution network,
minimizing transportation costs or distances.
    More importantly for GFS in the short term, it can create new DCs and
drop points with the system, as well as evaluate the impact of these
additions on current and future distribution expenses.
    GFS reports that it generated a list of potential sites for DCs as a
result of using the strategic planning system. Using demand forecasts each
year for a 10-year period, the distributor said it will evaluate all of
these locations. This will enable GFS to make a decision about land
acquisition, as well as the level of automation for the new facility. -
G.V.
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 INDUSTRY CODES/NAMES: AGRI   Agriculture, Fishing and Tobacco; FOOD
    Food, Beverages and Nutrition; TRAN   Transportation, Distribution and
  Purchasing; BUSN   Any type of business
 DESCRIPTORS: Motor vehicle fleets--Management; Logistics--Automation;
  Distribution of goods--Computer programs
 PRODUCT/INDUSTRY NAMES: 7372310 (Business Software (ex Micro))
 SIC CODES: 7372 Prepackaged software
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Foodservice almanac software directory: a complete listing of packages for
  every phase of your operations. (Directory)
Casper, Carol
ID: The Voice of Foodservice Distribution, v30, n6, p59(12)
May 15, 1994
DOCUMENT TYPE: Directory   LANGUAGE: ENGLISH   RECORD TYPE: FULLTEXT;
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ABSTRACT: A directory of software packages for use by food service
operators in all aspects of their operation is presented. Software packages
and features include integrated systems, radio frequency and bar code
capability, laptops, direct access systems and electronic data interchange.
The open architecture of mainframe systems and the latest personal
computers make these features easily accessible to the foodservice
operator.

TEXT:
    Computer software is the "central nervous system" of most
distribution companies today. It brings data to decision-makers to inform
them of what is going on in the organization, and carries information back
to points of action to make things happen.
    Many of the listings in this year's directory reflect the growing
trend toward automation. Integrated systems through which information flows
seamlessly from one part of the operation to another are streamlining such
activities as order processing, purchasing, and warehouse management.
    Features that not long ago were considered "cutting edge" are
becoming standard in packages designed for foodservice distributors. Among

them are radio frequency and barcode capabilities in the warehouse, to laptops for salespeople, direct access systems for customers, and EDI.

New entries in the directory also reflect growing integration of functions. A new package from *Roadnet*, for example, is designed to help companies marry routing functions with strategic sales-territory management.

Distributors are increasingly looking to inbound freight as a source of profit, and several providers have obliged with sophisticated software to support traffic management.

Best of all, today's PCs and the open architecture of new mainframe systems, are putting these capabilities within more companies' reach.

1. INTEGRATED MANAGEMENT PACKAGES

ACCUTECH COMPUTER SYSTEMS LTD. 1730 St. Laurent Blvd., Suite 130 Ottawa, Ontario K1G 5L1 (613) 737-3549 FAX: (613) 737-2015 Contact: Kim P. Underhill

FOOD MANAGEMENT SYSTEM (FMS)

Fully integrated system for food distributors. Modules include warehousing, inventory control, purchasing, order entry/invoicing, sales/ profitability analysis, vendor-rebate tracking, AR, AP, GL, food show, and pricing/contract management. Additional software and interfaces available to *deliver* a total "seamless" solution.

Hardware required: IBM AS/400.

ADVANCED FOODSYSTEMS, INC. 4201 N. 24th St., Suite 380 Phoenix, Ariz. 85016 (602) 957-9770 FAX: 602-957-9828 Contact: Leslie Lerman

FOODDISTRIBUTE

Integrated, real time, food-specific distribution and financial system used by distributors from $15 million to $3+ billion in sales. Highly user-definable and flexible. Integrated RDBMS, report writer and query language. Includes: order entry, invoicing, pricing/discounting, commissions, promotions/allowances, deals/rebates/off invoices/ free goods, purchasing, sales analysis, credit management, inventory control, warehouse management, route/*delivery* management, yielding/bill of materials, lot accounting, AR, AP, GL.

Hardware: IBM, HP, DEC, NCR, Unysis, other UNIX.

CEDAR SOLUTIONS, INC. Route 2 Box 252 Churchville, Va. 24421 (703) 337-7186 Contact: Stephen Smith

FOOD DISTRIBUTION PROCESSOR FDP (TM)

Custom software includes order entry/invoicing, inventory, purchase orders: AR; AP; GL. Options: payroll, vehicle maintenance, fixed assets. Features contract pricing, catchweights, customer price books, history recall, seasonal inventory indicators, multiple warehouses, broken case sales, stock control, routing control, sales analysis, extensions for dairies. Available complete or in modules.

Hardware required: Unix server.

COMPUTER TASK GROUP, INC. 5730 Oakbrook Parkway, Suite 105 Norcross, Ga. 30093 (404) 263-3400 FAX: (404) 263-3442 Contact: Fred Gates

CTG DMAS (DIST. MGMT. ACCTG. SYSTEM)

Fully integrated, wholesale distribution system operating on the ABM AS/400 and System/36. Modules include: order entry and invoicing, sales analysis, purchasing, inventory control and management, AR, AP, GL, and payroll. Applications can work together or individually. 1994 AS/400 DMAS enhancements will include: Route/day/stop, driver route sheets, catchweight pricing, and enhanced integrated customer, item, and vendor searches.

Hardware required: IBM AS/400 or System/36.

DALY & WOLCOTT, INC. 141 James P. Murphy Highway West Warwick, R.I. 02893 (800) 343-2414 (401) 823-8400 FAX: (401) 823-7268 Contact: Marketing Dept., ext. 351

A+ APPLICATION PLUS (TM)

Fully integrated distribution/financial applications for wholesale food and foodservice distributors. Modules include: order entry, sales analysis, price maintenance, purchasing, inventory management & planning, AR, AP, GL, fixed assets, inventory accounting, warehouse management. Order processing with flexible pricing, substitute/complement items, quotes, order history, sales analysis, and remote order entry.

Hardware required: IBM AS/400 or System/36.

DATA PROCESSING SERVICES, INC. 8888 Keystone Crossing, Suite 1700 Indianapolis, Ind. 46240 (317) 574-4300 FAX: (317) 574-4322 Contact: Sandy Skinner

DPS/9000 DISTRIBUTION AND FINANCIAL MANAGEMENT SYSTEM

Utilizes advanced relational database capabilities of the AS/400 to integrate sales-order processing through inventory management/purchasing, and financial functions, for a complete business management and reporting system. Custom program enhancements.

Hardware required: IBM AS/400.

DATA TECH SERVICES, INC. 437 Pennsylvania Ave. Fort Washington, Pa. 19034 (800) 899-5220 (215) 646-5290 FAX: (215) 540-0758 Contact: W.J. Bauscher

DPMS

Designed for food distribution using AS/400 to operate in native mode. Includes integrated modules for purchasing, receiving, inventory control, order entry, route *scheduling*, invoicing, sales analysis, AR, AP, and GL. Additions include radio frequency and laptop interfaces, food show, self-service store, user-defined forms, menus and security.

Hardware required: IBM AS/400.

DISTRIBUTION MANAGEMENT SYSTEMS, INC. an affiliate of: EMS Solutions, Inc. 12000 West Park Place Milwaukee, Wis. 53224-3026 (800) 558-8727 Contacts: Joseph Greene, David Saintsing

EAGLE FOOD DISTRIBUTION V5.0

The next generation of wholesale food distribution software. Food Distribution Mgmt. System includes: purchasing, inventory control and warehousing, order processing, price books, food show module, AR, AP, payroll. Additional packages include: DSR laptop interface, on-line fax, EDI, barcode warehouse, PIR inventory, and MSI/Telxon systems. Based on advanced Synergy Application Development Environment, EAGLE V5.0 offers a 4th G/L environment and can run on over 80 platforms including Unix. Migration to Windows NT is also available.

Hardware required: N/A

EFFICIENT DATA PROCESSING, INC. One John St., Suite 1D P.O. Box 909 Babylon, N.Y. 11702 (516) 321-6800 FAX: (516) 321-0188 Contact: Al Cohen

MARGINS PLUS SYSTEM

Complete order processing to general ledger for wholesale food, restaurant/janitorial supplies, and paper distributors. Includes customer price list and purchase history with last, average, and future buys; price maintenance by customer, product, customer class; customer class maintenance for telemarketing and suggestive selling; contract maintenance and reporting; order exception report, high-to-low analysis by product and/or customer; price trend analysis; flexible commissions.

H&S COMPUTER SYSTEMS, INC. 690 Commercial Federal Tower 2120 South 72nd Street Omaha, Neb. 68124 (402) 397-8757 FAX: (402) 397-8451 Contact: Vic Hamilton

FOOD DISTRIBUTION APPLICATIONS

Fully integrated Food Distribution Software Applications, include: billing, inventory, sales analysis, bid contracts, spiff tracking/vendor rebates, purchase-order mgmt. w/SOQ, vehicle record keeping, suggested retail pricing, AR, AP, GL, bill of materials processing, and trade-show systems. Also available: laptop order-entry systems.

Hardware required: IBM AS/400 or System/36.

LABATT FOOD SERVICE 4500 Industry Park Dr. P.O. Box 2140 San Antonio, Texas 78297 (512) 661-4216 Contacts: Blair Labatt, Jr.; Tony Canty

LABATT DATA PROCESSING SYSTEM

Integrated system assists management-level decision making. Package emphasizes modules to track gross margin components. Other modules include: integrated vendor review systems, purchasing/receiving, inventory management, order processing, AR, AP, GL, payroll, sales/driver/warehouse commission systems, error tracking for statistical quality analysis, just-in-time letdowns and reserve slotting, multiple-warehouse inventory/purchasing systems, and customer database for tracking bid awards.

Hardware required: IBM AS400.

MANCO MARKETING GROUP/TARGET DATA SYSTEMS, INC. 1818 Pot Spring Road, Suite 18 Timonium, Md. 21093 (800) 827-5715 (410) 560-5722 FAX: (203) 887-6561 Contact: Sam Flannery

DISTRIBUTOR 4GL

State-of-the-art foodservice distribution package written by foodservice distributors in consultation with Neumeier Associates. Includes all stanard functional areas as well as rebate tracking from PO to vendor AR, sophisticated purchasing module, integrated pen-based DSR lap- top system written in C++, barcoded stock control system via hand-held terminal, fax capability, EDI, and barcoded ID automated timeclock. Capabilities include unlimited data retention, pop-up help on all fields, paperless work-flow and threaded inquiry. Written in Progress 4GL to run under Progress RDBMS/Unix.

Hardware required: IBM RS/6000 or PowerPC.

NATIONAL DISTRIBUTOR SYSTEMS 959 Main St. Stratford, Conn. 06497 (203) 378-6010 FAX: (203) 377-5585 Contact: Bob Steinis

CONTROL

Specialized for food distributors. Includes order processing, picking, routing, invoicing, inventory control, purchasing, commissions, AR, sales analysis, price books, product catalogs. Accommodates catchweights, splits, multiple slots, bids, promos, deals, rebates, multiple street prices, spiffs, cost per serving, suggested retail, subs, loan equipment, food shows, remote order entry, bar coding. Companion systems include AP, GL, payroll, vehicle maintenance, salesrep laptop system, PC interfaces.

Hardware: Any model DEC.

NEW ENGLAND COMPUTER SERVICES, INC. 168 Boston Post Rd., Suites 6 & 7 Madison, Ct. 06443 (800) 766-6327 (203) 245-3999 FAX: (203) 245-4513 Contacts: Chris Anatra, Harold Haynes

NECS FOOD DISTRIBUTING SYSTEM

Order entry, accounts receivable, inventory control, and purchase-order system for use as standalone or in a multi-user network environment. Barcode module prints labels for inventory receiving and barcode order sheets. Remote laptop system available. Standard features include unlimited pricing levels, catchweights, tracking cash receipts and backorders, and processing features such as yield percentages and inventory kits. GL, AP, and payroll available.

Hardware: IBM 386 compatible or better with hard drive--operates on LANtastic, Novell, or similar networks.

NECS LITE

Scaled-down version, priced under $1,000, for small, growing distributors. Includes standard features such as: invoicing, AR, catchweights, easy-to-change invoices, 15 price levels per item plus unlimited special prices, sales rep commissions. Reports include price lists, picklists, ledger listings, gross profit reports, loading sheets, others. Supports Advance Disposal Fee for Fla. distributors.

Hardware: IBM 286 PC compatible or better running DOS 5.0 or higher, hard disk, 640K.

PROPHET 21, INC. 19 West College Ave. Yardley, Pa. 19067 (800) PROPHET (800-776-7438) FAX: (215) 321-8001 Contact: Thomas F. Ward

PROPHET 21 SYSTEM

Fully integrated on-line, interactive business-management system. Includes inventory control, automatic purchasing, product *delivery*, billing, EDI, with user-friendly features adapted to the distributor marketplace. Prophet 21 also operates sales, service, and training facilities in Atlanta, Boston, Chicago, Dallas, Los Angeles, Seattle, and Toronto, Canada.

Hardware required: IBM RISC System/6000.

SOFTWARE ENGINEERING CORP. 18707 Middletown Road Parkton, Md. 21120 (410) 329-6578 FAX: (410) 357-8717 Contact: Carl J. Waters

FOODMAN (R)

Food Distribution Management System is an integrated software packaged developed to meet the specific operational and accounting needs of

foodservice distributors. Software modules include order processing, inventory, sales analysis, purchasing, AR, AP, GL, payroll, and a companion laptop system. Features include: catchweights, deals, single item number for cases and broken case units, suggested buying, extensive pricing options, truck routing and interface for *Roadnet*, *pick*-*up* processing, hazardous materials tracking and reporting, lot tracking, laptop and PC interfaces for DSRs and customers, interface for hand-held terminals, direct fax capability; accommodates UCS/EDI order transactions.

Hardware required: IBM AS/400.

THE SYSTEMS HOUSE, INC. 1033 Route 46 Clifton, N.J. 07013 (201) 777-8050 FAX: (201) 777-3063 Contact: Fred Walfish, ext. 611

MASTER DISTRIBUTOR SYSTEM (MDS)

Integrated management system with specific enhancements for food distributors, designed to operate in a multi-company, multi-warehouse environment. Includes: order processing, warehouse management, quotation and bid management, sales analysis, purchasing, inventory control and management, AR, AP, GL, and financial reporting. Plus interface to portable data-entry devices, customer remote order-entry system, catchweights with user definable min/max tolerances and barcode interface capability, multiple pricing units of measure, multiple picking capability--pallet, order, bulk, label, truck routing and driver reconciliation, profitability analysis including labor costs.

Hardware: IBM RS6000; any UNIX-based system.

SYNTAX SOFTWARE CORP. 1212 Avenue of the Americas New York, N.Y. 10036 (212) 827-0950 FAX: (212) 827-0955 255 Consumers Rd. North York, Ontario M2J 1R4 (416) 499-4939 FAX: (416) 499-7489 Contact: John Vincze

SYNTAX FOODSERVICE DISTRIBUTION/400

An integrated online solution designed for the foodservice industry to provide instant answers for the business. Modules including: order processing/billing, telesales, pricing, sales analysis, inventory management & control, purchasing, deals, route control, EDI, beverage equipment control, credit control with financial applications including AP, GL, and fixed assets.

Hardware required: IBM AS/400.

UNICOM SALES ASSOCIATES, INC. 777 Walnut Avenue Cranford, N.J. 07016 (908) 709-9400 FAX: (908) 709-9401 Contact: Rita Bhandari

WHOLESALE FOOD DISTRIBUTION SYSTEM (WFDS)

A comprehensive system for on-line management and planning of a refrigerated wholesale food distributor. Totally integrated system from order entry through shipping, inventory control, purchasing, and accounting. Features include sales lists of customers to call each day, allocation of oversold items, creation and summary of pick tickets, truck routing for efficient *delivery*, date and lot number control. Allows negative balances of items in inventory and selling out of a specific lot number. Inventory contains cube, standard and catchweights.

Hardware required: IBM AS/400 or S/36.

WORLDWIDE CHAIN STORE SYSTEMS, INC. 111 East Wacker Dr., Suite 1620 Chicago, Ill. 60601-4503 (704) 595-6718 FAX: (704) 595-6789 Contact: Sandra Gilson

A range of on-line, fully-integrated systems for warehouse management, labor management, purchasing/investment buying, and order management/billing. Incorporates IBM Inforem Ill Forecasting and Replenishment System. Systems range from mainframe products to AS/400 release for larger operations. WCSS also offers real-time control warehouse automation software using RF and barcode technology, for AS/400 platform.

Hardware required: Mainframe or IBM AS/400.

II. SALES AND CUSTOMER SERVICES

ACCESS INTERNATIONAL 17130 S. Torrence, Suite 500 Lansing, Ill. 60438 (800) 835-3200 FAX: (708) 895-8187 Contact: Chuck Gladfelter

ORDERWRITER (TM)

Remote order entry software package designed for DSRs using laptops and mobile pen and tablet computers and/or for customers using desktop PCs. Designed to improve operational efficiency by eliminating duplication in the order-entry process. Reduces DSR calls to office. Provides DSR with

information on product, inventory availability, AR, pricing, and more, facilitaing a more consultative sale, resulting in better account service and higher sales volume. Order Writer (TM) is compatible with any host computer system.

Hardware required: Any IBM compatible laptop, mobile pen and tablet or desktop PC.

AUTOMATED CATALOGUE SERVICES, INC. 487 Devon Park Dr., Suite 215 Wayne, Pa. 19087 (610) 687-7500 FAX: (610) 687-7510 Contact: Greg Richards

FIRST PLACE

Electronic catalogue of e&s for the foodservice industry, published monthly on CD-ROM. Includes up-to-date pricing from nearly 250 e&s manufacturers. Entries are indexed so users can search for specific products and characteristics like dimensions, electrical requirements, certifications, or shipping details. Also contains manufacturers' CAD symbol libraries.

FIRST QUOTE

Companion program for preparing bids, quotations, and project budgets. Computes product costs and selling prices, estimates inbound freight charges and streamlines "cut" book preparation. Automatically selects and prints spec sheets for products in First Place; allows inclusion of other items and customized information. Maintains a database on outstanding bids, quotations, and project budgets. Users can create special reports and extract/download data to order entry, inventory and accounting systems.

Hardware: IBM PC 386, 486 or compatible; CD-ROM drive.

COMPUTRITION, INC. 9121 Oakdale Ave., Suite 201 Chatsworth, Calif. (800) 222-4488 FAX: (818) 701-1702 Contact: Ellyn Luros

COMPUTRITION SOFTWARE SYSTEMS

Designed to be used by food distributors as a value-added service to lock-in customers. Capabilities include menu and production planning, recipe and ingredient costing, purchasing and order guides, automatic order entry, automatic price updates, and nutritional analysis. Customized menu-writing services also available.

DAXUS CORPORATION One Oliver Plaza Pittsburgh, Pa. 15222-2603 (412) 566-4900 FAX: (412) 566-3284 Contact: John Knoebel

THE CONSULTANT

Native Microsoft Windows-based sales tool to make DSR order-entry function more efficient and effective. A tool for consultative sales designed to help DSRs increase number of items ordered and margins.

THE CONSULTANT CBMS

Customer business management system with inventory control and remote order entry for oeprators. Designed to improve profitability.

PROFIT MANAGER

Cost-control module and planning system for food preparation environment. Elements such as recipes, entrees, menus, banquets, and catering, and buffet/salad bar can be managed and costed taking into account yield, labor, overhead, ingredients, preparation time, etc.

FBIX, INC. (The Food & Beverage Information EXchange, Inc.) 8350 Bristol Court, Suite 101 Jessup, Md., 20794 (301) 497-6330 FAX: (301) 497-6334 Contact: Michael P. Fredrick

ORDER/ENTRY PLUS (TM)

PC application which is a Windows-based, network communications service that allows foodservice distributors to receive orders from customers via direct electronic communication links. Enables distributor to provide customers full product lists with customer-specific pricing information in an easy-to-use format. Distributors have the ability to provide product and price updates as frequently as they choose. Services include direct interface to distributor's central data processing system.

Hardware required: Supports all platforms.

INFORMATION CLEARINGHOUSE, INC. 19627 South Santa Fe Ave. Rancho Dominguez, Calif. 90221 (310) 763-6478 FAX: (310) 763-3693 CompuServe [76300,400] Contact: Steven A. Hall

MARKET/NET (TM) ONLINE CATALOG AND ORDER DESK SOFTWARE

Designed to let distributors sell hundreds of thousands of products,

24 hours a day. Massive catalogs are easily viewed in page-to-page presentation form, including popup windows for ordering. Information transmitted in "real time" eliminating need for CD-Rom updates, diskettes, or time-consuming downloads. Graphics and faxbacks may be attached.

Hardware: IBM 386 compatible and modem.

NORTH AMERICAN SYSTEMS, INC. 2807 N. Parham Rd., Suite 107 Richmond, Va. 23294 (804) 273-6720 FAX: (804) 273-6724 Contact: W.C. Taliaferro

ADAM

Multi-featured order management system. Has laptop module for the field, internal PC network module for customer service, and PC module for customers. Features on-screen order guides, computerized catalog and price book, electronic message system, and menu costing. Customer module includes inventory control.

Hardware: ADAM PC Receiver Tower, laptops and PCs of user's choice.

(See other listing under Warehouse)

SALES PARTNER SYSTEMS P.O. Box 808 Daytona Beach, Fla. 32115 (800) 777-2924 FAX: (904) 673-4730 Contact: Marty Weil

SPS-LINK

Notebook and/or pen-based systems designed specifically for DSRs. Includes electronic price book, order entry, customer-specific unit/portion cost book, food-cost manager, E-mail, AR, desktop organizer, operator profiles, and detailed product descriptions (XPD-Database).

VAS-LINK

Desktop system designed for use by foodservice operators at their locations. Includes direct order entry, food-cost management, inventory tracking, XPD-Database information display, and order transmittal.

ISS-LINK

PC-based local area network (LAN) application designed to automate inside sales staffs. Allows access to complete list of all customer-specific order guides, pricing information, accounts receivable, desktop organizer, purchasing history, operator profiles, and the XPD-Database.

XPD-LINK

The family of PC-based applications that supports the XPD Database product.

XPD Database is a detailed product description database that supports all fields in the IFDA Standard Product Database Format. Fully integrated with the three order-entry systems described above, it contains thousands of product descriptions supplied by over 125 top suppliers. XPD ShowCase is a standalone PC-based application that displays information on all products in the XPD Database plus supports displaying color images.

RPI-LINK (RESIDENT PROFILE INFORMATION)

Resident Profile/Diet Tray Card application designed for healthcare customers to maintain and print patient profiles and automatically generate diet tray cards and nutrition snack labels. Profiles include resident's name, room number, doctor or dietitian, diet type, admission data, age, food preferences, allergies, etc. Available for VAS-Link system or as a standalone application.

THINQUE SYSTEMS CORP. 11755 Victory Blvd., #250 N. Hollywood, Calif. 91606 (818) 752-1350 FAX: (818) 752-1355

Contact: Bridget Karlin

SALES TRAQ (R)

Windows for Pen Sales & Order Entry Very intuitive, easy-to-use pen-based sales and orderentry system. Includes wireless communications for sending and receiving data anywhere. With electronic price book, commission by item, on-line inventory stock status, standard and customizable order guide, portion cost, fast product search, sales history, customer credit history, nutritional information, embellishments, customer and prospect *scheduling*, messaging, user-defined reports.

III. PURCHASING AND INVENTORY CONTROL

BACG, INC. (See listing in Warehouse category)

E3 ASSOCIATES, LTD. 1800 Parkway Pl., Suite 600 Atlanta, Ga. 30067-8288

Contact: Lloyd N. Graham 5842 Edson La. N. Bethesda, Md. 20852-2934

E3TRIM Easy-to-use, on-line, integrated purchasing and inventory-management system designed to help foodservice distributors achieve high service levels and maximum profitability. Forecasts demand, seasonality, safety stock needs. Automatically calculates lead-times, vendor discount profitability. Includes on-line building of orders, integrated deal buying, promotions planning and tracking, investment monitoring, purchase-order writing, tracking, and receiving, projection and order analysis.

Hardware: IBM AS/400.

IBM CORP. Inventory Solutions P.O. Box 2150 Atlanta, Ga. 30055

Contact: Marshall Evans or local IBM sales rep.

INFOREM III - INVENTORY FORECASTING AND REPLENISHMENT PACKAGE

Solution to inventory management problems of optimizing balanced inventory and maximizing customer service. Builds from existing stock status system to generate optimum suggested purchase orders. Assists in determining when to purchase, how often, and how much to purchase for a company's staple inventory.

Hardware required: IBM System/370 (VSE/SP, MVS/XA, MBS/SP or MVS/ESA environments).

LOGICNET a division of Information Resources, Inc. 150 North Clinton St. Chicago, Ill. 60661-1416 (312) 474-2031

Contact: Andre Martin

LOGICNET SOFTWARE

A Windows-based distribution resource planning (DRP) program designed to formalize the inventory demand management process between end-users, wholesalers/distributors, and manufacturers. Built around a spreadsheet-like engine that displays, tabulates, calculates and maintains inventory planning data at the SKU and store/distribution center level, by accessing IRI's scan database. Modules include: link, commit, replenish/deploy, load, combine, and maintain. Business partners can use various modules to synchronize replenishment, distribution *scheduling* and manufacturing planning.

Hardware required: 486 PC-compatible.

OMI INTERNATIONAL, INC. 1501 Woodfield Rd., Suite 100W Schaumburg, Ill. 60173 (708) 517-1116 FAX: (708) 517-1138

Contact: James L. Meece

OMI SYSTEMS 90'S INVENTORY MGMT.

Software enables turn, promotion, and forward buy inventory management via item, vendor, warehouse planning modules, statistical forecasting, allocation/load building, and these on-line modules: recommended PO review, integrated diverter ordering, inbound tracking, receiving, directed putaway, inventory tracking, warehouse transfers, and vendor invoice/PO matching for accounts payable.

Hardware required: IBM System/38 or AS/400, RISC 6000, or Mainframe 43XX or larger.

IV. WAREHOUSE

BACG, INC.

3030 Warrenville Rd., Suite 300 Lisle, Ill. 60532 (708) 505-5775 FAX (708) 505-0707

Contact: Peter Wolf

DSC3000 - SUPPLY CHAIN MANAGEMENT

On-line, real-time distribution system for purchasing, warehouse, labor, inbound/outbound management. Functions include on-line buying, cost control, forecasting, inbound-freight *scheduling*, receiving, pallet-location control, replenishment, automatic slotting.

Hardware required: IBM 4300 series or larger and UNIX. Available on mainframe or Windows-based client server open systems distributed platforms. Operates separately or as part of integrated supply chain architecture.

CROWN EQUIPMENT CORP. New Bremen, Ohio 45869 (419) 629-2311 FAX: (419) 629-3762

Contact: Dave Helmstetter

FLEETKEEPER

Integrated software for monitoring maintenance records and operating

costs for lift trucks or other equipment. Generates and controls work orders, preventative maintenance *schedules*, maintains inventory control, calculates maintenance cost per hour. Data fields are set up for lift trucks, but flexible for other applications.

Hardware: IBM PC compatible with 20MB HD.

DALLAS SYSTEMS CORP. 12740 Hillcrest Rd., Suite 150 Dallas, Texas 75230 (214) 233-3761 FAX: (214) 788-4208.

Contact: Gina Smith

THE DALLAS SYSTEM

Logistics software including fully integrated warehouse management, labor control, radio frequency, and transportation management modules. Developed in the "open systems" environment, programs provide flexibility in implementation plus "scalability" for various size operations and ability to utilize distributed networks of both small and large processors.

Hardware required: IBM ES/9000, IBM RISC System 6000, Tandem.

GAGNON AND ASSOCIATES 15320 Minnetonka Blvd. Minnetonka, Minn. 55345 (612) 935-9000 FAX: (612) 935-9218

Contact: Dara Gault

COMPUTER-AIDED LABOR MGMT. (CALM)

Real-time warehouse labor-reporting and -*scheduling* system designed to manage labor productivity in receiving, put-away, selection, letdown, and loading. Performance reporting and *scheduling* may be based on historical data or engineered standards. Work assignments are down-loaded to CALM from host billing system, allowing managers and supervisors to access amount of time required to complete outstanding work assignments or monitor performance. Flexible report formats allow users to select amount of detail and range of days and shifts to report.

Hardware Required: IBM PC compatible (386 or higher), PC netowrk, IBM AS/400.

MATERIAL HANDLING SYSTEM (MHS) Standards calculation and labor reporting system for forklift operators. Utilizing RF technology to communicate pallet moves, MHS creates a discrete, after-the-fact time standard for every pallet move by calculating vertical and horizontal distance. Process eliminates distance averaging and makes it possible to evaluate performance and train operators on preferred methods. Flexible performance reports designed for area supervisor provide historical documentation for employee reviews.

Hardware required: IBM 486 PC compatible.

GATEWAY DATA SCIENCES CORP. 3410 E. University, Suite 100 Phoenix, Ariz. 85034 (602) 698-7000 FAX: (602) 437-8230

Contact: Hugh Collins

WAREHOUSE CONTROL SYSTEM/400

An on-line warehouse-management system developed for the IBM AS/400. WCS/400 provides complete warehouse automation functions including receipt *scheduling*, catchweight processing, directed, interactive putaway and replenishment, as well as label-based or RF-based picking and shipping. WCS/400 supports RF and barcoding systems as well as integration with material-handling systems.

Hardware required: IBM AS/400.

HAUSHAHN SYSTEMS & ENGINEERS 4610 44th St. S.E. Grand Rapids, Mich. 49512-4015 (616) 285-3311 FAX: (616) 285-3312

Contact: Karen McCullough

VIAWARE (TM)

Warehouse-management system for inventory control, task dispatchment, lot control, and ex-piring goods tracking. By use of barcodes, laser scanners, and radio-frequency technology, tracks order entry, receiving, put-away, picking, cycle counting, and shipping functions in real-time.

Hardware: Any computer supporting Unix-based environment, with hard disk with 200 MG free and 32 MG RAM.

IMREX COMPUTER SYSTEMS, INC. 307 E. Shore Road Great Neck, N.Y. 11023 (516) 466-5210 FAX: (516) 466-3341

Contact: Elizabeth Silverman

IMREX INTERNATIONAL LOGISTICS SYSTEM (ILS/400)

Lets distributors optimize warehousing procedures using leading-edge

automation techniques such as radio-frequency communication, bar coding, and EDI. Includes critical inventory management functions that ensure time savings and proper handling. Provides solutions to order entry, purchasing, demand forecasting, distribution resource planning, and transportation and freight functions.

Hardware required: IBM AS/400.

INTELLIGENT COMPUTER ENGINEERING, INC. 1 Business Way Hopedale, Mass. 01747 (508) 478-4880 FAX: (508) 478-5519

Contact: Todd R. Legget

SLOT-X WAREHOUSE SLOT AND STORAGE LAYOUT ANALYSIS

Distribution and warehouse slotting analysis for pick path lane or full warehouse optimization and space analysis. Prime for full-case or partial-case analysis for a variety of rack types and range of product lines including supplies, grocery, or perishables. Software analyzes product characteristics such as movement, cube, weight, crushability, etc., to match appropriate product to storage structure. Available as drop-in system or on service bureau basis. Graphics included.

Hardware required: IBM PC compatible. (See other listing under Transportation)

MACRO INTERNATIONAL, INC. 11785 Beltsville Drive Calverton, Md. 20705 (301) 572-0200 FAX: (301) 572-0992

Contact: Mike Burroughs

WCS-UX

Total warehouse-control system based on radio-frequency (RF) technology including automation of carousels and conveyors. Streamlines receiving, putaway, picking, packing, shipping, cycle counts, blast freezing. Special emphasis on invnetory turns, product dating, shelf life, lot numbers, FIFO. Interface to order entry, purchasing and/or manufacturing.

Hardware required: UNIX and HP/3000 based hardware for 486, HP, AS/400, RS/6000, others.

NORTH AMERICAN SYSTEMS 2807 N. Parham Rd., Suite 107 Richmond, Va. 23294 (804) 273-6720 FAX: (804) 273-6724

Contact: W.C. Taliaferro

ADEPT - ADVANCED DATA ELECTRONIC PRODUCT TRACKING SYSTEM

Microcomputer-based automated warehousing system that uses radio-frequency terminals for data collection, verification, and communication. Covers receiving, putaway, tracking movements within warehouse, replenishment, picking, shipping, cycle counts, and inventories.

Hardware: IBM-compatible PC, report printer, barcode label printer, portable handheld RF bar code readers, and RF base station/controller. (See other listing under Sales.)

NRM SYSTEMS, INC. 1653 20th Ave. NW Saint Paul, Minn. 55112 (612) 633-4251

Contact: Ram Krishnan

PACK-MAN

Graphically simulates a warehouse operation, allowing users to model different layouts and operational systems based on actual data. System can be used to pin-point productivity and problems for any time period taking into account seasonal changes, and determine impact of changes in aisles, slots, reserve locations, equipment, manpower. Can be used to fine-tune work patterns, design and refine a warehouse, streamline existing facilities. Package includes software custom-modified to fit specific warehouse and ongoing updating and consultation.

Hardware required: IBM PC compatible.

PERFORMANCE ANALYSIS CORP. P.O. Box 13684 Research Triangle Park, N.C. 27709-3684 (919) 549-0023 FAX: (919) 549-9710

Contact: John Neblett

SLOTIT WAREHOUSE LAYOUT AND SLOTTING OPTIMIZATION SYSTEM

An interactive system to determine the best location for every item in the pickline. Uses current-item and shipment data to determine optimal slotting and recommend changes in storage methods and rack structures. Provides layout-management tools such as: analysis of configured slots vs. item requirements, family and sub-family group integrity requirements based

on item demand and/or characteristics, interactive "point and shoot" slot assignments/reassignments, flags mis-slotted items. Interfaces with warehouse and order management systems via ASCII data transfer.

Hardware required: IBM PC compatible. (See other listing under Transportation)

TELXON CORP. 3330 West Market St. Akron, Ohio 44334-0582 (216) 867-3700 (800) 800-8001 FAX: (216) 869-2232

Contact: Patti Satterfield

RFXPRESS

System integration tool for radio frequency hand-held computer environment. Allows fast development of multi-user, multi-tasking RF systems with simplified programming techniques. Allows migration of existing and new applications to 1990's real-time architecture. Includes PC development software and run-time software to support daily operations, PTC-RFX interpretive software, and system manager. Supports Telxon RFX PTCs, handheld and forklift-mounted, RFX Controllers, 80386 PCs.

Hardware required: 80386 PC or OS/2 platform.

V. TRANSPORTATION

BAUER AND GRAMZA, INC. Suite 111 4015 Executive Park Drive Cincinnati, Ohio 45241 (513) 563-7700 FAX: (513) 563-8770

Contact: Tom Bauer

TMS-90 INBOUND TRAFFIC MGMT. SYSTEM

Inbound traffic management automation tool that handles vendor allowance calculations, carrier and carrier rate management, sheltered income calculation and billing profit reporting for private fleet and third-party backhauling. Imports POs from your mainframe buying system. Reports on "Lost Opportunities" for increasing backhaul profits. Truckload carrier assignment by cost and LTL consolidation. Easy-to-use mouse support with pulldown menus and context-sensitive help screens.

Hardware required: IBM486 PC compatible or Pentium PC running MS-DOS.

ERIC C. BAUM & ASSOCIATES, INC. 205 W. Wacker Dr., Suite 1622 Chicago, Ill. 60606 (312) 527-2570 (800) 366-2570 FAX: (312) 606-0220

Contact: David Wilson

VEHICLE *SCHEDULING* AND CONTROL SYSTEM

Controls routing, *scheduling*, and dispatching of *delivery* fleets using engineered standards to measure driver performance. Uses actual driving distances, establishes routing sequences by defining shortest driving distances between sites, prints driver trip log in *delivery* sequence.

CADEC SYSTEMS, INC. 8 East Perimeter Rd. Londonderry, N.H. 03053 (603) 668-1010 FAX: (603) 623-0604

Contact: Keith O'Brien

CADEC (R) MODULAR SERIES OFFICE SOFTWARE

Program analyzes data collected by Cadec on-board computers and produces management reports and graphs. Modular nature allows users to start with simple vehicle data analysis, then add driver-produced data such as *delivery* info, DOT hours of service, and fuel tax records. Depending on configuration, software provides analysis of: trip activities, driver & vehicle performance and utilization, *delivery* productivity, accidents, fuel economy, state fuel tax, DOT logkeeping/available hours/violations. Data can also be exported for integration with third-party software packages, spreadsheets and databases.

Hardware: IBM PC or compatible and Cadec onboard computer and data link or PCMCIA card reader.

CAPS LOGISTICS, INC. 2700 Cumberland Parkway Atlanta, Ga. 30339 (404) 432-9955 FAX: (404) 432-3146

Contact: Molly Bardoul

CAPS LOGISTICS TOOLKIT (TM)

Fully integrated system solves logistics challenges including routing, *scheduling*, and distribution planning. Uses a flexible fourth-generation macro language that lets users customize systems and reduce costs.

Hardware: IBM 386DX PC compatible or better.

INTELLIGENCE COMPUTER ENGINEERING, INC. 1 Business Way Hopedale, Mass. 01747 (508) 478-4880 FAX: (508) 478-5519
Contact: Todd R. Leggett
NOMAD-X ROUTING AND *SCHEDULING* SOFTWARE
Transportation/distribution management, routing, and optimization software, in modular structure to help managers meet operational needs while reducing costs and improving customer service. Modules include driver and vehicle assignment and tracking, history capture, multiple depot routing, and dynamic *delivery* locating. System includes mapping functions; customization possible.
Hardware required: IBM PC compatible.
DOOR-X DISTRIBUTION CENTER INBOUND/OUTBOUND DOOR *SCHEDULER*
Streamlined, interface module for connection with NOMAD-X, enables user to manage all aspects of inbound receiving cycle, including carrier assignment and routing control. Provides access to routing power of NOMAD-X for all inbound contracted or in-house purchase orders. Includes graphical, real-time status of inbound capacities and appointment activity, strategic combination of partial orders for optimal product flow to each facility, detailed reporting capabilities for inbound carriers, full capacity planning for multiple warehouses up to four weeks into future.
Fully integrative with any host management system.
Hardware required: IBM PC compatible. (See other listing under Warehouse)
MANUGISTICS, INC. 2115 East Jefferson St. Rockville, Md. 20852 (301) 984-50000
Contact: Arlene Schlosburg
MANUGISTICS TRANSPORTATION PLANNING (MTP)
Enterprise-wide transportation-planning system in a client/server environment. Considers and solves the transportation problem for each link in the supply chain simultaneously. Inbound and outbound transportation planning, execution, decision support, and performance tracking functions are integrated into one multi-user application.
Hardware required: Hewlett-Packard Series 9000 running HP/UX operating system and X-Windows/Motif.
ROUTING & *SCHEDULING*
A Powerful decision-support tool providing a systematic approach to solving distribution problems. Assures maximum customer service at minimum cost. Considers realworld constraints such as *delivery* windows, service commitments, road distances and drive times, and order size. Enables users to interact with system on-screen to view and modify distribution networks and routes.
Hardware required: IBM PC compatible.
MICROANALYTICS, INC. 2300 Clarendon Blvd., Suite 404 Arlington, Va. 22201-3367 (703) 841-0414 FAX: (703) 521-1693
Contact: Carolyn J. Scott
TRUCKSTOPS
TruckStops Fleet Routing System automatically generates optimum routes and *schedules* for fleets of five or more vehicles. System meets routing constraints such as actual drive time, *delivery* windows, vehicle capacities, backhauls, and others. Features include color maps and graphics, report writer, on-line help, mouse interface, on-screen editing in graphics, and automatic data-transfer capabilities.
Hardware required: IBM PC or compatible with hard disk, 640K RAM.
PERFORMANCE ANALYSIS CORP. P.O. Box 13684 Research Triangle Park, N.C. 27709-3684 (919) 549-0023 FAX: (919) 549-9710
Contact: Dan Basmajian
PERFORMANCE TRUCK-ROUTING SYSTEM (PTRS)
Cost-effective truck-routing tool. Route-planning module allows creation of master routes using one-week order forecast. Daily routing module imports orders from orderentry system and calculates least-cost routes based on user-chosen constraints. Route editor lets dispatcher make modifications and get feedback on cost of changes. Graphics-display option shows routes superimposed onto maps. Reports include driver logs and actual vs. planned route variance tabulations.

Hardware required: IBM PC compatible, DEC VAX, HP 9000, IBM RS6000.
ROADNET TECHNOLOGIES, INC. A *United* *Parcel* *Service* Co. 2311
York Rd. Timonium, Md. 21093 (800) *ROADNET* FAX: (301) 560-4328
    Contact: Amy W. Boblitz
    ROADNET 5000
    Automated routing and *scheduling* system designed to provide
least-cost routing solutions while balancing loads among trucks, meeting
customer time windows, and reducing overtime. Cost calculations based on
cost per mile for each vehicle and cost per hour for each driver. Matches
daily order information with customer profiles, computes recommended number
of trucks, calculates distances and travel times for accurate projections
and standards, plots preliminary routes and pinpoints stops on-screen,
recalculates loads, distances, and costs as router makes changes, considers
DOT parameters when assigning drivers, and provides manifests and cost
analysis reports. OS/2 operating system with multi-tasking capabilities
allows router to work on multiple tasks simultaneously, provides advanced
graphics for ease of use and "windowing" features. System includes actual
road network with natural barriers and speed limits, and enhanced Tiger
files showing road details such as names.
    Hardware: IBM PC or compatible with minimum 12 MB RAM, color monitor,
floppy drive, and 200 MB hard disk.
    TERRITORY PLANNER
    Strategic tool that enables route managers to configure routes in
cooperation with sales management to equitablyy balance territories.
Provides flexibility for route review and modification for continual
improvement in sales force performance and distribution productivity.
Allows management to: consider account types when configuring distribution
territories, evenly distribute account types among territories, divide
delivery sites by territories, routes, weeks and days of week, consider
accounts with variable *delivery* possibilities, maximize selling time and
vehicle utilization, determine optimum number of routes, determine which
depot would best serve an area when there are multiple depots under
consideration, and determine where to build new depots.
    ROCKWELL INTERNATIONAL CORP. Automotive Electronics 2135 W. Maple Rd.
Troy, Mich. 48084 (800) TRIPFAX
    Contact: Al Milligan
    TRIPMASTER PRO-SERIES SOFTWARE
    For use with Tripmaster onboard computer systems. Collection of
programs featuring pull-down menus, "help" screens, and concise reports.
Allows generation of customized reports, often including: Logtrak-DOT
reports, stop, route, round trip, event, and trend analysis, exception
reports, driver management, and driver incentives.
    ROADSHOW INTERNATIONAL, INC. 8300 Greensboro Dr., Suite 400 McLean,
Va. 22102-3604 (703) 790-8300 FAX: (703) 790-8333
    Contact: Susan Barry Hovermale
    ROADSHOW
    A PC-based vehicle-routing and -*scheduling* system that analyzes
data about a company's distribution operation and calculates least-cost
routes and *schedules* for *pickup* and *delivery*. Features full-color
images of commercial maps with vehicles displayed at planned locations
along route. Maps include color-coded stops, day-of-week, frequency of
service, and territory boundaries to facilitate changes. Instantly
recalculates route time, sales volume, case count, and territory balancing
measure as stops are changed or moved. Expanded street networks include
one-way streets, rush hour slow-down factors, bridges and road
construction. Increases fill rates while reducing drive times, mileage, and
vehicle costs. Handles service variables such as off-day *deliveries*, new
cusotmers and seasonal orders. Manages split-load routing.
    Hardware required: 486 PC.
    ROTEC--THE ROUTING TECHNOLOGY CO. 191 Albany Turnpike P.O. Box 529
Canton, Conn. 06019 (203) 693 0257 FAX: (203) 693-8091
    Contact: David J. Ross
    ROUTEPLANNER/LOADPLANNER/NETWORK-PLANNER/SERVICEPLANNER
    Microsoft Windows-based systems for automatic vehicle loading,

routing, and *scheduling* of multiple vehicles for *pickups* and *deliveries* on longhaul and local address basis. RoutePlanner system provides cost-saving routing and *scheduling* between street addresses, cities, and zip codes. LoadPlanner optimizes efficiency by locating each customer down to individual street addresses and determining optimal routing and vehicle loading based on weight and volume constraints, customer time windows, uploading times, and total available trip time. NetworkPlanner gives user ability to design and customize own transportation networks. ServicePlanner supports companies providing various types of *scheduled* services, calculting needs of personnel, travel considerations, and customer time windows. Used as integrated or separate systems, each application applies actual road miles to calculate network routes. Can be set up to automatically consider unique requirements such as adjusted speed limits, and road restrictions. Can produce detailed driving directions with driver manifests and *delivery*/*pickup* reports.

Hardware: standalone system, LAN, or interfaced with UNIX, AS/400, System/36, RS/6000 and other systems.

THOMAS M. WILLIAMS AND ASSOCIATES, INC. P.O. Box 7756 Atlanta, Ga. 30309 (404) 874-1298

Contact: Craig Thornton

SIR--SHIPMENT INBOUND ROUTING

Software for managing internal inbound freight program, designed to help reduce and control freight costs. Automatically determines least-cost carriers and assists in *scheduling* inbounds. Includes shipper and carrier master lists, load list, and weekly recap and savings reports.

Hardware required: IBM PC compatible.

WORLD INFORMATION SYSTEMS 925 W. Market St. #200 Greensboro, N.C. 27401 (910) 333-2580 FAX: (910) 333-2584

Contact: Pete Paquette

SHOPFAX (R)

Vehicle information system for fleet maintenance operations. *Schedules* preventive maintenance, tracks vehicle history, parts inventory/re-order, warranties.

Hardware: 486, RISC6000, Altos 3068, PC network.

XATA CORP. 500 East Travelers Trail Burnsville, Minn, 55337 (800) 262-9282 FAX: (612) 894-2463

Contact: Rich Hessler

DISTRIBUTION INFORMATION SYSTEM (DIS)

For use with XATA Driver Computer. System "learns" about every element in your fleet such as drivers, power units, routes, legs, and stops. It uses that learned knowledge and user guidelines to detect and report exceptions. Features include DOE driver logs, state fuel tax reporting, real-time fuel management, team communication, driver incentive programs, equipment and cargo management, and onboard driver dispatch. Extensive reporting allows users to "zoom" into detail as desired.

Hardware: IBM PC compatible and XATA Driver Computer.

VI. EDI

EDI ABLE, INC. 20 Valley Stream Parkway, Suite 140 Malvern, Pa. 19355 (800) 622-6118 FAX: (610) 993-0733

Contact: Larry Spoerl

POWER EDI MULTI-PLATFORM EDI TRANSLATION SOFTWARE W/MAPPER

Features intuitive and straightforward mapping utility. User, or translator, controls format of data exchanged with the application. Provides unlimited EDI functionality for one price--no more modules, kits or overlays needed.

FREDI STANDALONE/FRONT-END EDI SOFTWARE

DOS-based EDI translator, can be configured as a standalone or front-end. Includes data-entry screens, integrated communications, unattended operations, and flat file formats for host integration. Designed for customers just getting into EDI or needing print-out capabilities only. Migration path within EDI Able software product line provides flexibility for growth and helps minimize costs. Support for all standards.

INFORMATION ACCESS, INC. 8801 E. Pleasant Valley Road Cleveland, Ohio 44131-5150 (216) 328-0100 FAX: (216) 328-0913

Contacts: Kelley Atchison, Ed Schnell
ELECTRONIC COMMERCE
Computer software, hardware, and services for implementing
transaction sets specifically designed for the needs of the food industry.
Electronic commerce capability includes promotions, item maintenance,
spoilage, and market development funds. Over 17 years experience providing
systems to the foodservice industry.
STERLING SOFTWARE Electronic Commerce Group 4600 Lakehurst Court
Dublin, Ohio 43017-0760 (614) 793-7000 (800) 879-3341 FAX: (614) 793-7092
Contacts: Lee Bonneau, Dan Casey
GENTRAN: BASIC (TM) MGMT SOFTWARE (FOR DOS OR WINDOWS ENVIRONMENTS)
A modular EDI software product that provides EDI translation and
communications functions for personal computers. Package runs as standalone
on a PC or as front-end, and requires no programming. Flexible document
turnaround provides additional time and cost savings. The Toolkit module
lets users create custom screen and print templates to suite a range of
requirements.
Hardware required: IBM PC compatible (386 or higher recommended) with
DOS or Windows operating system.
COMMERCE: CONNECTION (TM) FOR WINDOWS
Designed to extend the way business is conducted electronically,
COMMERCE:Connection is a suite of products that allow users to interface
with COMMERCE:Network (Sterling's messaging network with mailbox
capability. COMMERCE:Mail blends conventional E-mail functionality with
sophisticated user requirements. COMMERCE:Library stores such compound
documents, drawings, membership lists, and other items. GENTRAN:Basis
provides EDI translation, communications, and essential management
capabilities. COMMERCE:Resource provides links with people and information
that can help companies work smarter. COMMERCE:Catalog allows vendors and
buyers to communicate product information electronically.
Hardware required: IBM PC compatible with Windows.
VII. MISCELLANEOUS
KOSITZKY & ASSOCIATES, INC. 1601 Greenbriar Pl., Suite J Oklahoma
City, Okla. 73159 (405) 692-1683 FAX: (405) 692-1698
Contacts: David Johnson, Mike Kositzky
GEO WHIZ
Graphic pin map and database. Contains over 360,000 miles of
interstate, U.S. highways, state roads, and city streets. Allows users to
map and display locations graphically. Can be used to geocode customer
locations and develop territories based on volumes and geographic area,
print maps. Files can be imported or exported. Optional GWSTREETS for U.S.
Counties features detailed city street maps and address lookup.
Hardware required: IBM compatible, 640K, mouse, 6 MB hard disk space,
Windows or DOS.
LAN INFOSYSTEMS, INC. 100 Grandview Rd., Suite 216 Braintree, Mass.
02184 (800) 352-6463 FAX: (617) 849-0317
Contact: Dan Johnson
NET YIELD
Business-management system for food processors and distributors with
weight-based products such as seafood, meat, and poultry. More than an
accounting system, provides accurate inventory control, margin management,
and distribution sales tools in cost-effective, fully integrated,
multi-user system. On-line customer sales history, inventory availability,
and automatic credit checking. Daily margin by item and by customer reports
identify "bad" business, and hold salespeople accountable. Actual costing
means companies work with precise weight and cost inventory, eliminating
unexplained variances.
Hardware required: IBM PC compatible, Novell network.
VANDEMARK PRODUCTS 1307 W. Main St. B2-2 Medford, Ore. 97501 (503)
779-8700
Contact: Robert VanDeMark
BETA COST
Computer-based accounting adjunct designed to help distributors
establish overhead rates and determine "outgoing costs" for each product

sold, that is, cost at time of sale. Uses available P&L data to calculate
overhead rates for each phase of distribution operation automatically, then
combines these with sales item data to calculate accurate "outgoing" unit
costs. Daily reports provide data on item, product line, sales order,
company profits. Designed for easy add-on to any existing accounting
system.

Hardware required: IBM PC compatible.

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SPECIAL FEATURES: illustration; photograph; table
INDUSTRY CODES/NAMES: TRAN   Transportation, Distribution and Purchasing
DESCRIPTORS: Food service--Automation; Software--Directories
PRODUCT/INDUSTRY NAMES: 7372000 (Computer Software); 5800000 (Restaurants
 & Food Service)
SIC CODES: 5812 Eating places; 7372 Prepackaged software
FILE SEGMENT: TI File 148

5/9/15   (Item 3 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
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07194161   SUPPLIER NUMBER: 15139312   (THIS IS THE FULL TEXT)
Computer update: today's hardware & software for wholesalers.
Modern Brewery Age, v45, n5, pS6(8)
Jan 31, 1994
ISSN: 0026-7538   LANGUAGE: ENGLISH   RECORD TYPE: FULLTEXT
WORD COUNT: 2738   LINE COUNT: 00223

TEXT:
        Micro Vane releases Version 8.3 of dBEV, announces customer service
improvements Micro Vane Inc. released version 8.3 of its dBEV software
program late in 1993, a year that also saw the Kalamazoo, MI, company take
several steps to strengthen what it calls its first priority--customer
service.
        We added three more people who will be responsible for contacting our
customers on a regular basis, we enhanced our internal software program
that governs customer support services, and we made a commitment to greatly
expanding the number of regional seminars we offer for customers," says Bob
Pursel, vice president of marketing for Micro Vane, one of the country's
largest producers of microcomputer software for the beverage industry.
        "Many of our customers don't have the need to call us for
software/hardware support so we have implemented a program to contact each
of them regularly to ensure they're getting the fullest utilization of
their system. We are replacing about 50 competitive systems per year, so
adding three new people has strengthened the program," Pursel says.
        Micro Vane says its track record for customer service earned it
recognition in the competition for the Norand VAR Quality Award. Because no
VAR may win the Quality Award in two consecutive years, Norand created a
new award for previous winners who continue to improve customer
satisfaction. Micro Vane says that it is the sole member of the new Norand
Quality Winner's Club.
        Micro Vane reports that it has enhanced its internally-developed
customer support system by adding an "expert" module that helps customer
service representatives handle customer inquiries more efficiently.
        Micro Vane says that the new module includes a great deal of
additional technical data about the customers' computer setup, "giving
Micro Vane representatives the ability to immediately answer a much wider
array of complex questions pertaining to brewery software, networking,
Route Commanders, etc." Also in 1993, Micro Vane hosted three regional
operator seminars and one management seminar to help customers get the
maximum benefit from new software features and to solicit suggestions for
future enhancements. Micro Vane says that the seminars have been so well
received that the company will expand the format, offering 9-12 smaller

regional seminars in '94.

On the subject of dBEV, Micro Vane says Version 8.3 incorporates hundreds TABULAR DATA OMITTED of new reporting enhancements. One new report that the company cites has been tailored to make it easy for customers to adhere to state-specific reporting requirements. In addition, Micro Vane says, the point-of-sale tracker module has been updated to allow distributors to identify the best possible locations for point-of-purchase displays at each of their customer sites and to track data on product displays.

According to Micro Vane, interest in Route-Commander portable data systems reached an all-time high in 1993. Fifty distributors added Route-Commander units to their existing dBEV systems, whether for driver-sell, pre-sell or both. Approximately one-fourth of Micro Vane's 800+ dBEV customers are now using hand-held data systems. One reason, according to Micro Vane: wholesalers generally can avoid the expense of a new computer system by adding hand-helds to their present system, regardless of whether their micro-computer is a 286, 386 or 486.

Micro Vane says it also enhanced its hand-held interface software to handle the DEX/UCS capabilities inherent in the Route--Commander portable systems.

Also added were Routebook capabilities for driver-sell and pre-sell and the ability to download pre-sold orders into a *delivery* person's portable unit for on-site adjustments at the point-of-sale.

Plus, the company reports that new multi-user capabilities allow several operators to access data on the interface software simultaneously--especially useful for larger wholesalers on networks, the vendor says.

"I would say that 1993 was the best of our 11 years in business," Pursel says. "We are working to help our customers have their best year ever in '94."

For more information, contact Micro Vane, Inc. 8135 Cox's Drive, Kalamazoo, MI, 49002. Tel: (800) 222-0677.

Insight announces successful introduction for Sales Manager

Insight Distribution Systems of Hunt Valley, MD, has announced a successful introduction for Insight Sales Manager this past summer.

"It's a product that was over two years in the making," says Insight president Max Landman, "and it has gotten a fantastic reception from our customers."

Landman says that Sales Manager was designed from scratch to integrate well with PC's, since any report can be transferred to another computer as a delimited ASCII file.

"It's designed to be usable by normal distributorship sales and office staffs," Landman reports, "A couple of hours of phone training is all that is required to learn how to create reports."

The company reports that the Insight Sales Manager can make "endless reporting possibilities" available to the user.

Features of the package include a flexible time period reporting capability. Using this feature, wholesalers can get reports for any time period: days, weeks, months, years or any combination. As an addition, ranking reports are offered for any item on the database: dollars, units; sales or profit information.

Exception reports can also be printed, and the program allows for varying report formats.

The Sales Manager can generate reports by customer, product, salesperson or route, region or chain; for unit and dollar sales, discounted cases and dollars. Items such as number of stops, profit per stop and percent profit are available by customer for any time period.

Insight says that the Sales Manager can instantly access invoice information by customer, date, route or company, allowing managers to see at a glance if an invoice was pre-sold, rending or driver-sale.

The report can show each product on the ticket, along with units ordered, sold, returned, and discounted; dollar sales, discount, deposit, cost; and the cash or charge account and amount.

The program contains over 120 sales and master items for reporting,

including: units, dollars, per unit dollars, percentages, percentage of subtotal, distribution, comparison reports and promotional reporting.

Landman says that Insight has developed and packaged over 100 reports with Sales Manager, including: Top ranking customer report by salesperson or company; chain store reports--ranking and product sales reports; salesperson 12-month comparison; dollar sales by chain; ten-week unit sales and discount; route sales profit and stop reporting by customer; period sales and new placements--by route and by salesperson; unit sales comparison by region and customer; product ranking by case equivalents with pre unit profit; brand distribution by premise for 12 months and year-to-date; customer master reports and product master reports.

The company also points to several additional capabilities for Sales Manager: Help screens that can be printed or spooled; creation of standard ASCII files for use with other software and a page width feature.

For more information, contact Insight, 222 Schilling Circle, Hunt Valley, MD 21031. Tel: (410) 329-1100.

New Truckstops 2

According to Micro Analytics, of Arlington, VA, the new Truckstops 2 Fleet Routing System represents a major advance in computerized routing technology. The company reports that the system provides improved performance; new data elements and data transfer capabilities; new custom reports; enhanced help; a new mouse interface; better mapping; updated StreetNet location databases and an interface to on-board computers.

"The new TruckStops is the next generation in routing software; it's not just another release," says J. Michael Hooban, president of Micro Analytics.

For more information, contact Micro Analytics, 2300 Clarendon Boulevard, Suite 404, Arlington, VA 22201. Tel: (703) 841-0414.

Beverage Systems, Inc. adds new features to Route Distribution System

Beverage Systems, Inc. of San Diego, CA says it has continued to add new features to its Route Distribution System (RDS), a software package designed expressly for beverage wholesalers. The RDS driver settlement procedure is now completely automated with the addition of Norand Driver-Sale hand-held computers, BSI says.

According to the company, these devices present the driver with an electronic routebook, from which he can enter sales. The hand-held then prints an invoice on the spot, ready for the customer's signature. In addition, the driver's cash and load sheet are automatically balanced and the sales are automatically transmitted to the RDS host computer which updates the customer's sale history and accounts receivable.

According to BSI, using these driver-sales hand-held units saves wholesalers money by eliminating driver computational errors, automating the maintenance of the driver route book, and eliminating the manual key-in of invoice and load sheet information by the clerical staff.

BSI says it also has a similar application wherein Norand terminals and printers are used by the *delivery* driver in a pre-sale environment. The actual invoice is resident in the hand-held terminal, and after any/all cuts and/or adds are made to the order the driver actually prints the invoice on the spot at the time of *delivery*.

In response to Miller Brewing's marketshare achievement plan (MAP), BSI has added new software to track point-of-sale items, displays, cooler sets, draft service and tap handles. A new report warns the wholesaler of products that are nearing the pull date.

Also new to the RDS are X-terminals. These graphics-capable terminals increase productivity of both management and clerical personnel by allowing several functions to be performed simultaneously at a single station. The X-terminal presents a set of windows, each of which can run an application as though it was a separate terminal. The operator uses a mouse to select (click on) a window, and then starts an application such as a sales report. While that application is running, the operator selects another window and initiates another report or function. Additional windows may be left at inquiry screens to handle incoming phone calls.

BSI says that yet another recently added feature to RDS fully automates the customer walk-in side of the wholesale business. A clerk at

the counter or loading dock enters the sales order as it is being given verbally by the customer. An invoice is printed immediately, as are *pick*-*up* documents for the warehouse. Warehouse personnel who will fill the order may be assigned electronically by the order taker. Call-in and will-call orders are also supported. Cash register drawers can also be integrated to terminals and printers located in the warehouse or dock sale area to complete the transaction. Complete reconciliation is automatic at the end of each day. Sales history etc. is also retained.

BSI says that it is currently engaged in a joint effort with Norand, developing a new "Pen View' system for pre-sales, collection P.O.S. and survey information. The first installation is *scheduled* for February 1994, in San Diego, CA. In addition to taking orders, the new "Pen View" has numerous other capabilities, and can do the following:

* Maintain customer profiles
* Keep track of sales quotes
* New placements
* Remote up-load and down-load
* Daily to MTD sales list
* Sales goals
* Calculate discounts
* Complete route --book capability
* Post-offs

In addition, BSI says the unit includes an optional auto calculation feature that can suggest new order quantities on hand, plus myriad other features.

For more information, contact Beverage Systems, Inc., 4930 Naples Street, San Diego, CA, 92110.

Roadnet introduces new software system

Roadnet Technologies, Inc., a *United* *Parcel* *Service* company based in Timonium, MD, has announced the release of its territory planner software system.

According to *Roadnet*, Territory Planner is a strategic tool that allows mute managers to configure mutes in cooperation with sales management to equitably balance territories. *Roadnet* says the system provides flexibility for route review and modification for continual improvement in sales performance and distribution productivity.

Roadnet says that the system "functions to support the route manager in the decision-making process."

Territory Planner provides "exceptional flexibility," *Roadnet* says, allowing the route manager to do the following:

* Reconfigure routes--combining or resequencing them for optimum efficiency.
* Rearrange stops to create the most desirable selling and service patterns.
* Review existing multi-day and multi-week muting structures.
* Isolate individual areas of the existing route structure for "what-it" analysis of fleet and route configurations.
* Geographically cluster and balance territories, weeks and days.
* Isolate and automatically restructure routes by account type.
* Do depot planning and logistics decision making.
* Work with sales management to adjust territories for the long term.
* Objectively evaluate driver productivity levels.
* Offer new perspectives and decision support for territory development, capital investment and staffing.

For more information, contact *Roadnet*, 23 11 York Road, Timonium, MD 21093. Tel: (800) *ROADNET*.

ICS adds Award enhancements

Intelligent Computer Systems, Inc. of Mountville, PA added several new features to its AWARD software in 1993.

For starters, the company reports that the Order Entry module now allows the user to fully customize invoices. Virtually any combination of customer and/or pricing information my be formatted by the user. Thus distributors who want to show items like suggested and/or extended retails, ´ sub-totals by brand or class, etc., can easily set up a custom invoice

format to do so. Invoice formats can even vary by customer so that
individuals and/or groups of customers (i.e. chains) can have custom
formats.

Also incorporated into the Order Entry driver settlement function is
the ability to track driver expenses, tolls, and/or cash receipts
throughout the day. In addition, detailed driver/truck inventory
accountability/control is now available, ICS says.

ICS reports that the AWARD file maintenance system was also enhanced.
In the product and customer files "Power FM" provides a new tool for
quickly changing repetitive information. Using it, the user selects a field
to be changed once and the group of customers or products to be modified.
The system will then automatically either globally insert a new value, or
prompt the user to insert new values. As opposed to selecting each product
or customer record, the field to be changed, and entering the new value,
ICS says "Power FM" can save a lot of time on routine file maintenance.

A new inventory management report is also available, ICS says. It
gives a detailed analysis, not only of main warehouse inventory, but also
inventory at other warehouses/locations; committed to customers; in transit
either from the brewery or to other warehouses, on *delivery* trucks, etc.

ICS also notes that it provides inventory aging analysis and allows
the user to track inventory below or above definable levels.

In addition to Normal Distribution and New and Lost Placement
reporting, distribution analysis has been enhanced to include Effective
Distribution. Thus, ICS says it is now possible to examine product, brand
and/or supplier distribution that only takes into account the possible
products that a given account or account group could buy.

New open systems hardware technology is available to run AWARD, ICS
reports. "Sophisticated architecture and the advanced UNIX operating system
have made it possible to install multi-processing computers offering
unprecedented levels of price and performance," ICS states.

The company says that the Pentium, a new generation processor now
available from Intel, offers 100 MIPS (million instructions per second)
performance on a CPU chip about two inches square.

Using multi-processing technology, up to four Pentium CPUs can work
simultaneously to satisfy system demand. According to Andy Hodge, sales
manager for ICS, "The beauty of these new multi-processing machines is that
they're scalable. By this I mean that a distributor can start off with a
single-processor computer, and add processors as their business grows or
their computing requirements increase via an inexpensive board upgrade.
Thus multi-processing computers offer an outstanding growth path."

Hodge says that enhancements to the integrated accounting system are
planned for '94.

For more information, contact ICS, 315 Primrose Lane, Mountville, PA,
17554. Tel: (717) 285-7977.

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Software packages get more sophisticated. (Directory)
Casper, Carol

ABSTRACT: Computer software companies are continually introducing new
software packages to help the daily operations of food distributors. New
software packages help automated and track a wide range of daily food
distribution operations such as inventory control, order processing and
purchasing. In addition, some software packages have applications in
electronic data interchange and bar code scanning. To help food
distributors familiarize themselves with the new software packages, a
directory of the new computers items is presented.

TEXT:
     FROM PURCHASING TO WAREHOUSING TO SALES, THESE PROGRAMS CAN HELP
ORGANIZE YOUR OPERATION
     Foodservice distribution continually grows more sophisticated. Nowhere
is this more apparent than in the computer software available to
distributors. In addition to helping companies automate and track results
of such daily functions as order processing, inventory control, and
purchasing, an increasing number of management packages have capabilities
for such advanced applications as electronic data interchange (EDI) with
suppliers and customers, interfaces for DSR laptops and pen computers, and
bar-code scanning for the warehouse.
     In addition, a shift is taking place to programs that offer
capabilities to use data for strategic analysis and planning. Increasingly,
software is available that gives managers the ability to say not only,
"This is how we did it," but also, "What would happen if we did it this
way?"
     Another notable trend is the growing array of sophisticated software
to run on inexpensive personal computers. Such programs reflect increases
in PC computing power over the past several years.
     Thus, the directory that follows includes programs that let you
simulate an entire warehouse operation on a PC screen, try out different
slotting and material-handling options, as well as PC-based packages for
inventory control, RF communications, bar-code scanning, and
sales-territory analysis.
     I. INTEGRATED MANAGEMENT PACKAGES
     ACCUTECH COMPUTER SYSTEMS LTD. 1730 St. Laurent Blvd., Suite 130
Ottawa, Ontario K1G 5L1 (613) 737-3549 FAX: (613) 737-2015 Contact: Kim P.
Underhill
     FOOD MANAGEMENT SYSTEM (FMS) Fully integrated system for food
distributors. Modules include warehousing, inventory control, purchasing,
order entry/invoicing, sales/profitability analysis, vendor-rebate
tracking, accounts payable/receivable, general ledger, food show, and
pricing/contract management. Additional software and interfaces available
to *deliver* a total "seamless" solution. Hardware required: N/A.
     ADVANCED FOODSYSTEMS 4201 N. 24th St., Suite 380 Phoenix, Ariz. 85012
(602) 957-9770 FAX: 602-957-9828 Contact: Leslie Lerman
     FOODDISTRIBUTE Fully-integrated, on-line system includes order entry,
invoicing, pricing/discounting, commissions, promotions/allowances,
deals/rebates/off invoice, receiving, purchasing, AR, AP, sales analysis,
credit management, inventory control, warehouse management, route/
delivery management, yielding/bill of materials, food shows, general
ledger/financials. Integrated RDBMS, report writer, query. Written for
UNIX-based open systems. Hardware required: IBM, HP, DEC, Motorola, NCR,
others.
     CEDAR SOLUTIONS, INC. P.O. Box 788 Tannersville, Pa. 18372 (717)
629-1616 Contact: Stephen Smith
     FOOD DISTR. PROCESSOR FDP (TM) Custom software includes order
entry/invoicing; inventory; purchase orders; AR; AP; GL. Options: payroll,
vehicle maintenance, fixed assets. Features contract pricing, catchweights,

customer price books, history recall, seasonal inventory indicators, multiple warehouses, broken case sales, stock control, routing control, sales analysis. Available complete or in separate modules. Hardware required: Unix server.

COMPUTER TASK GROUP, INC. 5703 Oakbrook Parkway, Suite 105 Norcross, Ga. 30093 (404) 263-3400 FAX: (404) 263-3442 Contact: Pam Vias

CTG DISTRIBUTORS MANAGEMENT ACCOUNT SYSTEM (DMAS) A fully integrated, wholesale distribution system operating on the IBM AS/400 and System/36. Modules include: billing, sales analysis, purchasing, inventory control, inventory management, AR, AP, GL and payroll. Applications can work together as single system or individually. Hardware required: IBM AS/400 or S/36.

DALY & WOLCOTT, INC. 141 James P. Murphy Highway West Warwick, R.I. 02893 (800) 343-2414 (401) 823-8400 FAX: (401) 823-7268 Contact: Tracy Christiana

A+ APPLICATION PLUS (TM) Fully integrated distribution/financial applications for wholesale food and foodservice distributors. Modules include: order entry, sales analysis, price maintenance, purchasing, inventory management & planning, AR, AP, GL, fixed assets, inventory accounting, warehouse management. Order processing with flexible pricing, substitute/complement items, quotes, order history, sales analysis, and remote order entry. Hardware: IBM AS/400, or System/36.

DATA PROCESSING SERVICES, INC. 8888 Keystone Crossing, Suite 1700 Indianapolis, Ind. 46240 (317) 574-4300 FAX: (317) 574-4322 Contact: Sandy Skinner

DPS/9000 DISTRIBUTION AND FINANCIAL MANAGEMENT SYSTEM Uses advanced relational database capabilities of AS/400 to integrate sales-order processing through inventory management/purchasing, and financial functions, for a complete business management/reporting system. Custom program enhancements. Hardware required: IBM AS/400

DATA TECH SERVICES, INC. 437 Pennsylvania Ave. Fort Washington, Pa. 19034 (215) 646-5290 (800) 899-5220 FAX: (215) 540-0758 Contact: W.J. Bauscher

DPMS System designed for food distribution using AS/400 to operate in native mode. Includes integrated modules for purchasing, receiving, inventory control, order entry, route *scheduling*, invoicing, sales analysis, AR, AP, and GL. Additions include radio frequency and laptop interface, food show, self-service store, user-defined forms, menus and security with no programming. Hardware required: IBM AS/400.

DISTRIBUTION MGMT. SYSTEMS, INC. 181 Research Dr. Milford, Conn. 06460 (203) 874-6019 FAX: (203) 877-5918 Contacts: Joseph Greene, Lynette Ramos

DMS EAGLE User-friendly, menu-driven system for food distributors. Includes order entry, pick lists/labels, invoicing, purchasing, receiving, *scheduling*, inventory control, sales analysis, AP, AR, GL, bar-coded warehouse management, loan equipment, food show, vehicle maintenance, and commissions. Add-on modules include remote order entry, laptop systems, EDI, point of sale, PIR, multiple warehouse, and multisite networking, and PC integration. Hardware: DEC VAX/VMS, ALPHA/AXP.

EFFICIENT DATA PROCESSING, INC. One John St., Suite 1D P.O. Box 909 Babylon, N.Y. 11702 (516) 321-6800 FAX: (516) 321-0188 Contact: Phil Troiani

MARGINS PLUS SYSTEM Complete order processing to general ledger for wholesale food, restaurant/janitorial supplies, and paper distributors. Includes customer price list and purchase history with last, average, and future buys; price maintenance by customer, product, customer class; customer class maintenance for telemarketing and suggestive selling; contract maintenance and reporting; order-exception report, high-to-low analysis by product and/or customer; price trend analysis; flexible commissions.

EMS SOLUTIONS, INC. 12000 W. Park Place Milwaukee, Wis. 53224 (800) 558-8727 Contact: David Saintsing

WHOLESALE FOOD DISTRIBUTION SYSTEM (WDS) Flexible, integrated software solution for food distributors including order processing, inventory management, purchasing, AP, AR, GL, and payroll. Emphasis is on easy-to-use

and easy-to-learn software at competitive prices. Complete conversion services available from existing systems. Hardware needed: DEC VAX or DEC Alpha.

H&S COMPUTER SYSTEMS, INC. 690 Commercial Federal Tower 2120 South 72nd St. Omaha, Neb. 68124 (402) 397-8757 FAX: (402) 397-8451 Contact: Vic Hamilton

WHOLESALE FOOD DISTRIBUTION SOFTWARE Integrated systems include billing/invoicing, inventory/warehousing, sales analysis, bid contracts, spiff/vendor rebates, purchase management, vehicle tracking, retail pricing, payroll, AR, AP, GL, bill/materials, trade show systems. Hardware: IBM AS/400 or System/36.

HARRISDATA 611 N. Barker Rd. Waukesha, Wis. 53186-0500 (414)˙784-9099 FAX: (414) 784-5994 Contact: Christine Englund

HARRISDATA/FDMS Integrated distribution/financial application system for small-to-medium-sized foodservice wholesalers. Has catchweight pricing, chain billing, UCS compliance, sales analysis, order entry. Subsystems: AP, AR, GL, human resources. Main module comprises order entry, invoicing, inventory, purchasing. Hardware: IBM AS/400 or System/36.

LABATT FOOD SERVICE 4500 Industry Park Dr. P.O. Box 2140 San Antonio, Tex. 78297 (512) 661-4216 Contacts: Blair Labatt, Jr. Tony Canty

LABATT DATA PROCESSING SYSTEM Integrated system assists management-level decision making. Package emphasizes modules to track gross-margin components. Other modules include: integrated vendor review systems, purchasing/receiving, inventory management, order processing, AR, AP, GL, payroll, sales/driver/warehouse commission systems, error-tracking for statistical quality analysis, just-in-time letdowns and reserve slotting, multiple-warehouse inventory/purchasing systems, and customer database for tracking bid awards. Hardware required: IBM AS400.

NATIONAL DISTRIBUTOR SYSTEMS 959 Main St. Stratford, Conn. 06497 (203) 378-6010 FAX: (203) 377-5585 Contact: Bob Steinis

CONTROL A specialized system for food distributors. Includes order processing, picking, routing, invoicing, inventory control, purchasing, commissions, AR, sales analysis, price books, product catalogs. Accommodates catchweights, splits, multiple slots, bids, promos, deals, rebates, multiple street prices, spiffs, cost per serving, suggested retail, subs, loan equipment, food shows, remote order entry, bar coding. Companion systems include AP, GL, payroll, vehicle maintenance and PC Interfaces. Hardware: Any model DEC.

NEW ENGLAND COMPUTER SERVICES, INC. 168 Boston Post Rd., Suites 6 & 7 Madison, Conn. 06443 (800) 766-6327 (203) 245-3999 FAX: (203) 245-4513 Contacts: Chris Anatra, Harold Haynes

NECS FOOD DISTRIBUTING SYSTEM Complete order-entry, accounts-receivable, inventory-control, and purchase-order system designed for use as standalone or in a multi-user network environment. Bar-code module prints labels for inventory receiving and bar-code order sheets. Remote laptop system available. Standard features include unlimited pricing levels, catchweights, tracking cash receipts and back orders, and processing features such as yield percentages and inventory kits. GL, AP, and payroll available. Hardware: IBM XT, PS/2 or 100% compatible with hard drive--operates on LANtastic, Novell, or similar networks.

PROPHET 21, INC. 19 West College Ave. Yardley, Pa. 19067 (800) PROPHET (800-776-7438) FAX: (215) 493-2531 Contact: Thomas F. Ward

PROPHET 21 SYSTEM Fully integrated on-line, interactive business-management system. Includes inventory control, automatic purchasing, product *delivery*, billing, EDI, with user-friendly features adapted to the marketplace. Prophet 21 also operates sales, service, and training facilities in Atlanta, Boston, Chicago, Cincinnati, Dallas, Los Angeles, Seattle, and Toronto, Canada. Hardware: IBM RISC System/6000 (TM).

SOFTWARE ENGINEERING CORP. 18707 Middletown Rd. Parkton, Md. 21120 (410) 329-6578 FAX: (410) 357-8717 Contact: Carl J. Waters

FOODMAN (R) Food Distribution Management System comprised of integrated software modules designed specifically for food distributors. Includes order processing, inventory control, sales analysis, purchasing, AR, AP, GL and payroll. Hardware required: IBM AS/400.

SYNTAX SOFTWARE CORP. 1212 Avenue of the Americas New York, N.Y. 10036 (212) 827-0950 FAX: (212) 827-955 or 255 Consumers Rd. North York, Ontario M2J 1R4 (416) 499-4939 FAX: (416) 499-7489 Contact: John Vincze

SYNTAX FOODSERVICE DISTRIBUTION/400 Integrated management application including order processing and billing, telesales, pricing, sales analysis, inventory management and control, purchasing, deals, route control, EDI, beverage equipment control, and financial applications. Hardware required: IBM AS/400.

UNICOM SALES ASSOCIATES, INC. 67 Walnut Avenue Clark, N.J. 07066 (908) 381-8300 FAX: (908) 381-8373 Contact: Patrick T. O'Connor

WHOLESALE FOOD DISTRIBUTION SYSTEM (WFDS) A comprehensive system for on-line management and planning of a refrigerated wholesale food distributor. Integrated system from order entry through shipping, inventory control, purchasing, and accounting. Features sales lists of customers to call, allocation of oversold items, creation and summary of pick tickets, truck routing for efficient *delivery*, date and lot-number control. Allows negative balances of items in inventory and selling out of a specific lot number. Inventory contains cube, standard, and catch-weights. Hardware required: IBM AS/400 or S/36.

WORLDWIDE CHAIN STORE SYSTEMS INC. 111 East Wacker Dr., Suite 1620 Chicago, Ill. 60601-4503 (312) 856-1600 FAX: (312) 616-6483 Contact: Roger Pollack

On-line, fully-integrated systems for warehouse/labor management, purchasing/investment buying, and order management/billing. Incorporates IBM Inforem III Forecasting and Replenishment System. Systems range from mainframe products to AS/400 release for larger operations. Hardware: Mainframe or IBM AS/400.

II. SALES AND CUSTOMER SERVICES

ACCESS INTERNATIONAL 17130 S. Torrence Ave., Suite 500 Lansing, Ill. 60438 (800) 835-3200 FAX: (708) 895-8187 Contact: Matthew Hook

ORDERTAKER (TM) Remote order entry/information Salesman's Toolkit for unattended order entry directly to/from any host. Features include electronic order book, customized order guides and buying histories, multiple price matrices, modules profiled for healthcare, institutional white tablecloth, MUA, Nat. chain accounts, C-stores, AR files, Menu Planner, suggested order calculation, and electronic mail. Hardware required: Any IBM compatible laptop or desktop with 256K system memory and hard drive with 5MB available space, modem. Any host.

ORDER WRITER (TM) Same as above but utilizing a mobile pen and tablet in place of remote PC or desktop computer.

VOICE-ACKNOWLEDGED PROCESSING (VAP) Allows remote users to transmit hand-held computer data directly to files on an IBM host. Digitally recorded voice prompts direct users in sending data and notify them of host acceptance. Data can be resent if transmission is incomplete. Hardware: supports any handheld unit capable of sending data to an IBM host.

AUTOMATIC CATALOGUE SERVICES, INC. 487 Devon Park Dr., Suite 215 Wayne, Pa. 19087 (215) 687-7500 FAX: (215) 687-7510 Contact: Steven M. Katz

FIRST PLACE Electronic catalogue of equipment and supplies for the foodservice industry, published monthly on CD-ROM. Includes up-to-date pricing from nearly 250 E&S manufacturers. Entries are indexed so users can search for specific products and characteristics like dimensions, certifications, or shipping details. Also contains manufacturers' CAD symbol libraries.

FIRST QUOTE Companion program for preparing bids, quotations, and project budgets. Computes product costs and selling prices, estimates inbound freight charges, and streamlines "cut" book preparation. Automatically selects and prints spec sheets for products in First Place; allows inclusion of other items and customized information. Maintains a database on outstanding bids, quotations, and budgets. Users can create special reports and extract/download data to order entry, inventory, and accounting systems. Hardware required: IBM PC 386, 486 or compatible and CD-ROM drive.

COMPUTRITION, INC. 9121 Oakdale Ave., Suite 201 Chatsworth, Calif. 91311 (800) 222-4488 FAX: (818) 701-1702 Contact: Ellyn Luros

COMPUTRITION SOFTWARE SYSTEMS Designed to be used by food distributors as value-added service to lock-in customers. Capabilities include menu and production planning, recipe and ingredient costing, purchasing and order guides, automatic order entry, automatic price updates and nutritional analysis. Customized menu-writing services available.

FBIX (THE FOOD & BEVERAGE INFORMATION EXCHANGE) 9455 Washington Blvd., Suite E Laurel, Md., 20723 (301) 497-6400 FAX: (301) 604-4757 Contacts: Michael Frederick, Bret Wacker

ORDER/ENTRY PLUS (TM) PC-based, Windows-driven network communication service that allows foodservice distributors to receive orders from and send information to customers via direct electronic communication links. Enables distributors to provide customers with a comprehensive package of value-added products and services in easy-to-use format. Added services include laptop interface, manufacturer advertising, nutritional guides, flexible pricing, and order history. Hardware: IBM compatible 386 w/modem.

INFORMATION CLEARINGHOUSE, INC. 19627 South Santa Fe Ave. Rancho Dominguez, Calif. 90221 (800) 537 7373 (310) 763-6478 FAX: (310) 763-3693 CompuServe |76300,400
    Contact: Steven A. Hall

MARKET/NET (TM) Simple software package allows anyone to create their own electronic catalog and automated order-desk system, enabling customers to order directly using a PC and modem. Can be tied into existing order-entry, billing, and warehousing systems. Customers are guided through ordering process by user-friendly messages. Hardware required: IBM compatible 386 or better with modem.

NORTH AMERICAN SYSTEMS, INC. 2807 N. Parham Rd., Suite 107 Richmond, Va. 23294 (804) 273-6720 FAX: (804) 273-6724 Contact: Joey Pierce

ADAM Multi-featured order-management system. Has laptop module for field salespeople, internal PC network module for customer service reps, and PC module for customers. Features on-screen order guides, computerized catalog and price book, electronic message system, and menu costing. Customer module includes inventory control. Hardware required: ADAM PC Receiver Tower, laptops and PCs of user's choice.

ADAM JR. Hand-held terminal order-entry package for salesreps and customers. One- and two-way communication options available. User-friendly screen prompts insure complete orders. Bar coding may be incorporated. Hardware required: Portable data collection terminals, 80386 PC, modems, host communications card.
    (See other listing under Warehouse)

SALES PARTNER SYSTEMS P.O. Box 808 Daytona Beach, Fla. 32115 (904) 672-8434 (800) 777-2924 FAX: (904) 673-4730 Contact: Marty Weil

SPS-LINK Laptop system designed specifically for DSRs. Includes electronic price book, order entry, customer-specific unit/portion cost book, food-cost manager, e-mail, AR, desktop organizer, operator profiles, and detailed product descriptions (XPD-Database). System is updated daily via modem to give DSRs current stock status levels and pricing information.

VAS-LINK Desktop system designed for use by foodservice operators at their locations. Includes direct order entry, food cost management, inventory tracking, XPD-Database information display, and order transmittal.

ISS-LINK PC-based local-area-network (LAN) application designed to automate inside sales staffs. Allows access to complete list of all customer-specific order guides, pricing information, accounts receivable, desktop organizer, purchasing history, operator profiles, and XPD-Database.

XPD-DATABASE Detailed product description database that supports all fields in the IFDA Standard Database Format. Fully integrated with above three applications, it contains over 15,000 item descriptions and is expected to include over 20,000 by the end of 1993. With text and color pictures, updates. XPD-Showcase--Standalone version of product database.

TRAY CARD APPLICATION Resident Profile/Diet Tray Card application designed for healthcare customers to maintain and print patient profiles and automatically generate diet tray cards. Profiles include information such as resident's name, room number, doctor or dietician, diet type, admission data, age, food preferences, dining choice, allergies, and

dietary notes. Available for VAS-Link system or as a standalone.
    III. PURCHASING AND INVENTORY CONTROL
    BACG, INC. (See other listing under Warehouse)
    E3 ASSOCIATES, LTD. 1800 Parkway Pl., Suite 600 Atlanta, Ga.
30067-8288 Contact: Lloyd N. Graham 5842 Edson La. Rockville, Md.
20852-2934 (301) 468-6526 FAX: (301) 984-7947
    E3TRIM Easy-to-use, on-line, integrated purchasing/inventory
management application. Can be attached to any stock status system.
Includes accurate forecasts, automatic calculation of safety stock,
management-set service objectives, demand and lead time seasonality, vendor
discount profitability analysis, automatic on-line building of orders,
integrated deal buying, promotions planning and tracking, investment
monitoring, purchase-order writing, tracking, and receiving. Hardware
required: IBM AS/400.
    IBM CORP. Inventory Solutions P.O. Box 2150 Atlanta, Ga. 30055
Contact: Local IBM sales office or rep, or Marshall Evans at address above.
    INFOREM III - INVENTORY FORECASTING AND REPLENISHMENT PACKAGE
Efficient, comprehensive solution to inventory-management problems of
optimizing balanced inventory and maximizing customer service. Builds from
existing stock-status system to generate optimum suggested purchase orders.
Assists in determining when, how often, and how much to purchase for a
staple inventory. Hardware: IBM System/370 (VSE/SP, MVS/XA, MBS/SP or
MVS/ESA environments).
    VENDOR MANAGED REPLENISHMENT SERVICE VMRS allows manufacturers and
wholesalers to meet customers' requirements for continuous replenishments.
It combines the INFOREM III replenishment system, EDI communications
capability, and creation of suggested orders on the IBM ADVANTIS
(Information) Network. The service also provides consulting. VMRS software
can also be installed on supplier/s host system with INFOREM III. Hardware:
A system to translate, send, and receive EDI communication documents.
    LOGICNET 150 North Clinton St. Chicago, Ill. 60661-1416 (312) 474-2031
Contact: Andre Martin
    LOGICNET SOFTWARE A Windows-based distribution resource planning (DRP)
program to formalize the inventory-demand-management process between
end-users, wholesalers/distributors, and manufacturers. Built around a
spreadsheet-like engine that displays, tabulates, calculates, and maintains
inventory-planning data at the SKU and store/distribution-center level.
Modules include: link, commit, replenish/deploy, load, combine, maintain.
Business partners can use various modules to synchronize replenishment,
distribution *scheduling*, and manufacturing planning. Hardware required:
386 PC-compatible.
    OMI INTERNATIONAL, INC. 1501 Woodfield Rd., Suite 100W Schaumburg,
Ill. 60173 (708) 517-1116 FAX: (708) 517-1138 Contact: James L. Meece
    OMI SYSTEMS 90'S INVENTORY MANAGEMENT Software enables turn, promotion
and forward-buy inventory management via item, vendor, warehouse planning
modules, statistical forecasting, allocation/load building, and these
on-line modules: recommended PO review, integrated diverter ordering,
inbound tracking, receiving, directed putaway, inventory tracking,
warehouse transfers, and vendor invoice/PO matching for accounts payable.
Hardware: IBM System/38 or AS/400, RISC 6000, or Mainframe 43XX or larger.
    IV. WAREHOUSE
    BACG, INC. 1301 W. 22nd St., Suite 914 Oak Brook, Ill. 60521 (708)
571-1616 FAX (708) 571-2193 Contact: Gordon Schlagel
    DCS3000 - SUPPLY CHAIN MANAGEMENT On-line, real-time distribution
system for purchasing, warehouse, labor, inbound/outbound management.
Functions include on-line buying, cost control, forecasting,
inbound-freight *scheduling*, receiving, pallet-location control,
replenishment, automatic slotting, inventory adjustments. Hardware: IBM
4341 or larger and UNIX.
    CROWN EQUIPMENT CORP. New Bremen, Ohio 45869 (419) 629-2311 FAX: (419)
629-3762 Contact: Dave Helmstetter
    FLEETKEEPER Integrated software for monitoring maintenance records and
operating costs for lift trucks or other equipment. Generates/controls work
orders, maintenance *schedules*, maintains inventory control, calculates

maintenance cost/hour. Data fields are set up for lift trucks but flexible for other applications. Hardware required: IBM PC compatible with 20MB hard drive.

DALLAS SYSTEMS CORP. 12740 Hillcrest Rd., Suite 150 Dallas, Texas 75230 (214) 233-3761 FAX: (214) 788-4208 Contact: Mickey Johnson

THE DALLAS SYSTEM Logistics software including fully integrated warehouse management, labor control, radio-frequency, and transportation-management modules. Developed in the "open systems" environment, programs provide flexibility in implementation plus "scalability" for various size operations and ability to utilize distributed networks of both small and large processors. Hardware required: IBM ES/9000, IBM RISC System 6000, Tandem.

GATEWAY DATA SCIENCES CORP. 3410 East University, Suite 100 Phoenix, Ariz. 85034 (602) 968-7000 FAX: (602) 437-8230 Contact: Mike McPheeters

WAREHOUSE CONTROL SYSTEM/400 A comprehensive, on-line warehouse-management system developed for the IBM AS/400 and RS/6000 using computer-assisted software engineering (CASE) technologies. Supports integration of radio-frequency terminal networks, material-handling systems, and label-printing subsystems. Functions include receipt *scheduling*, receiving, and quality assurance, physicals, cycle counts, dynamic inventory locator, putaway, replenishment, picking, and shipping. Optional module: labor management system. Hardware: IBM AS/400 or RS/6000.

HAUSHAHN SYSTEMS & ENGINEERS 4610 44th St. S.E. Grand Rapids, Mich. 49512-4015 (616) 285-3311 FAX: (616) 285-3312 Contact: Don Humphreys

VIAWARE (TM) Warehouse-management system for inventory control, task dispatchment, lot control, and expiring-goods tracking. By use of bar codes, laser scanners, and radio-frequency technology, tracks order entry, receiving, put-away, picking, cycle counting, and shipping functions in real-time. Hardware: Any computer supporting Unix-based environment, with hard disk with 200 MG free and 32 MG RAM.

IBM WCSS/Distribution Technology Division 7500 East Independence Blvd. Charlotte, N.C. 28277-9405 (704) 563-5648 Contact: Bill Mangum

IBM AS/400 DISTRIBUTION SOLUTION Real-time, integrated, custom warehouse system tracks products and directs work flow using radio-frequency terminals and bar codes. Relational database provides control of movable units and tracks activities. Covers receiving, quality, putaway, replenishment, order processing, picking, shipping, manifests, inventory control, host interfaces, custom interfaces to mechanization, ticketing, kitting, and other functions. Hardware required: IBM AS/400.

INTELLIGENT COMPUTER ENGINEERING, INC. 1 Business Way Hopedale, Mass. 01747 (508) 478-4880 FAX (508) 478-5519 Contact: Todd R. Leggett

SLOT-X WAREHOUSE SLOT AND STORAGE LAYOUT ANALYSIS Distribution and warehouse slotting analysis for pick path lane or full warehouse optimization and space analysis. Prime for full-case or partial-case analysis for a variety of rack types and wide range of product lines including supplies, grocery, or perishables. Software analyzes product characteristics such as movement, cube, weight, crushability, etc., to match appropriate product to storage structure. Available as drop-in system or on service bureau basis. Graphics included. Hardware required: IBM PC compatible.

(See other listing under Transportation)

MACRO INTERNATIONAL 8850 Stanford Blvd., Suite 4000 Columbia, Md. 21045 (410) 290-2800 FAX: (410) 290-2999 Contact: Mike Deal

WCS Total warehouse-control system using radio-frequency technology to streamline receiving, picking, packing, putaway, shipping, cycle counts, plus productivity analysis. Prints labels from either a hardwired station or portable printer attached to forklift-mounted terminal. Interfaces with order entry, inventory system. Hardware required: IBM, DEC, HP, others.

NORTH AMERICAN SYSTEMS 2807 N. Parham Rd., Suite 107 Richmond, Va. 23294 (804) 273-6720 FAX: (804) 273-6724 Contact: Joey Pierce

ADEPT - ADVANCED DATA ELECTRONIC PRODUCT TRACKING SYSTEM Microcomputer-based automated warehousing system that utilizes radio-frequency terminals for data collection, verification, and communication. Covers receiving, putaway, tracking warehouse movements,

replenishment, picking, shipping, cycle counts and physical inventories. Hardware required: ADEPT Processor for network file server and host communications controller, report printer, bar-code label printer, forklift-mounted RF bar-code readers, portable handheld RF bar-code readers, and RF base station/controller.

ADSCAN Data-collection/management system allows a company to create, operate, and modify data-collection systems in-house on a microcomputer. Main features: applications generator for hand-held and bar-coding systems, PC receiver, user-defined database manager with built-in report generator, and host communications controller. Hardware required: microcomputer, barcode printers, portable RF and/or fixed data-collection terminals and scanners.

(See other listing under Sales)

NRM SYSTEMS, INC. 1653 20th Ave. NW Saint Paul, Minn. 55112 (612) 633-4251 Contact: Ram Krishnan

PACK-MAN Software program graphically simulates a warehouse operation, allowing users to model different warehouse layouts and operational systems based on actual data. System can be used to pinpoint productivity and problems for any time period taking into account seasonal changes, and determine impact of changes in aisles, slots, reserve locations, equipment, and manpower. Can be used to fine-tune work patterns, design and refine a new warehouse, streamline existing facilities, rearrange facilities, or help decide whether to expand. Package includes software custom-modified to fit specific warehouse and ongoing updating and consultation. Hardware required: IBM PC compatible.

PERFORMANCE ANALYSIS CORP. P.O. Box 13684 Research Triangle Park, N.C. 27709-3684 (919) 549-0023 FAX: (919) 549-0825 Contact: John Neblett

SLOTIT WAREHOUSE LAYOUT AND SLOTTING OPTIMIZATION SYSTEM An interactive system to determine the best location for every item in the pickline. Uses current item and shipment data to determine optimal slotting and recommend changes in storage methods and rack structures. Provides layout management tools such as: analysis of configured slots vs. item requirements, family and sub-family group integrity requirements based on item demand and/or characteristics, interactive "point and shoot" slot assignments/reassignments, flags mis-slotted items. Interfaces with warehouse and order-management systems via ASCII data transfer. Hardware required: IBM PC compatible.

(see other listing under Transportation)

TELXON CORP. 3330 West Market St. Akron, Ohio 44334-0582 (216) 867-3700 (800) 800-8001 FAX: (216) 869-2232 Contact: Patti Satterfield

RFXPRESS System integration tool for radio frequency hand-held computer environment. Allows fast development of multi-user, multi-tasking RF systems with simplified programming techniques. Allows migration of existing and new applications to 1990's real-time architecture. Includes PC development and run-time software to support daily operations, PTC-RFX interpretive software, and system manager. Supports Telxon RFX PTCs, hand-held and forklift-mounted, RFX Controllers, 80386 PCs. Hardware: 80386 PC or OS/2 platform.

V. TRANSPORTATION

ERIC C. BAUM & ASSOCIATES, INC. 205 W. Wacker Dr., Suite 1622 Chicago, IL 60606 (312) 527-2570 (800) 366-2570 FAX: (312) 606-0220 Contact: David Wilson

VEHICLE *SCHEDULING* AND CONTROL SYSTEM Controls routing, *scheduling* , and dispatching of *delivery* fleets using engineered standards to measure driver performance. Uses actual driving distances, establishes routing sequences by defining shortest driving distances between sites, prints driver trip log in *delivery* sequence.

CADEC SYSTEMS, INC. 8 East Perimeter Rd. Londonderry, N.H. 03053 (603) 668-1010 FAX: (603) 623-0604 Contact: Katy Bergevin

CADEC (R) MODULAR SERIES OFFICE SOFTWARE Program analyzes data collected by CADEC onboard computers and produces management reports. Modular nature allows users to start with vehicle data analysis, then add data such as *delivery* info, DOT hours of service, and fuel tax records. Depending on configuration, software provides analysis of: trip activities,

driver & vehicle performance, *delivery* productivity, accidents, fuel economy, state fuel tax, DOT logkeeping/available hours/violations. Data can also be exported for integration with third-party payroll, maintenance, routing, as well as with fuel tax software. Hardware: IBM PC or compatible and CADEC onboard computer and data link.

MICROANALYTICS, INC. 2300 Clarendon Blvd., Suite 404 Arlington, Va. 22201-3367 (703) 841-0414 FAX: (703) 521-1693 Contact: Carolyn J. Scott

TRUCKSTOPS 2 TruckStops 2 Fleet Routing System automatically generates optimum routes and *schedules* for fleets of five or more vehicles. System meets routing constraints such as actual drive time, *delivery* windows, vehicle capacities, backhauls, and others. Features include color maps and graphics, a new report writer, on-line help, mouse interface, on-screen editing in graphics, and automatic data-transfer capabilities. Hardware required: IBM PC or compatible with hard disk, 640K RAM.

PERFORMANCE ANALYSIS CORP. P.O. Box 13684 Research Triangle Park, N.C. 27709-3684 (919) 549-0023 FAX: (919) 549-0875 Contact: Dan Basmajian

PERFORMANCE TRUCK-ROUTING SYSTEM (PTRS) Cost-effective truck routing tool. Route-planning module allows creation of master routes using a one-week order forecast. Daily routing module imports orders from order-entry system and calculates least-cost routes based on user-chosen constraints. Route editor lets dispatcher make modifications and get feedback on cost effects of changes. Graphics display option shows routes superimposed onto maps. Reports include driver logs and actual versus planned route variance tabulations. Hardware required: IBM PC compatible, DEC VAX, HP 9000, IBM RS6000.

ROADNET TECHNOLOGIES, INC. A *United* *Parcel* *Service* Co. 2311 York Rd. Timonium, Md. 21093 (800) *ROADNET* FAX: (301) 560-4328 Contact: Amy W. Boblitz

ROADNET 5000 Automated routing and *scheduling* system designed to provide least-cost routing solutions while balancing loads among trucks, meeting customer time windows, and reducing overtime. Cost calculations based on cost per mile for each vehicle and cost per hour for each driver. Matches daily order information with customer profiles, computes recommended number of trucks, calculates distances and travel times for accurate projections, plots preliminary routes and pinpoints stops on-screen, recalculates loads, distances, and costs as router makes changes, considers DOT parameters when assigning drivers, and provides manifests and cost-analysis reports. Its OS/2 operating system with multi-tasking capabilities allows router to work on multiple tasks simultaneously, provides advanced graphics for ease of use and "windowing" features. System includes actual road network with natural barriers and speed limits, and enhanced Tiger files showing road details such as road names and types. Hardware: IBM PC or compatible with minimum 12 MB RAM, color monitor, floppy disk drive, and 200 MB hard disk.

ROCKWELL INTERNATIONAL CORP. Automotive Electronics 2135 W. Maple Rd. Troy, Mich. 48084 (800) TRIPFAX Contact: Al Milligan

TRIPMASTER PRO-SERIES SOFTWARE For use with Tripmaster onboard computer systems. Collection of programs featuring pull-down menus, "help" screens, and concise reports. Allows generation of customized reports, often including: Logtrak-DOT reports; stop, route, round trip, event, and trend analysis; driver management; and driver incentive.

ROADSHOW INTERNATIONAL, INC. 8300 Greensboro Dr., Suite 400 McLean, Va. 22102 (703) 790-8300 FAX: (703) 790-8333 Contact: Kathy Stanek

ROADSHOW Vehicle-routing and -*scheduling* system that analyzes data about a company's distribution operation, calculates least-cost routes and *schedules* for *pickup* and *delivery*. Features full-color images of commercial maps with vehicles displayed at planned locations along route. Maps include color-coded stops, day-of-week, frequency of service, and territory boundaries to facilitate changes. Instantly recalculates route time, sales volume, case count, and territory balancing measure as stops are changed or moved. Expanded street networks include one-way streets, rush hour slow-down factors, bridges, and road construction. Hardware required: 386 or 486 PC.

ROTEC - THE ROUTING TECHNOLOGY CO. 191 Albany Turnpike P.O. Box 529

Canton, Conn. 06019 (203) 693-0257 FAX: (203) 693-8091 Contact: David J. Ross

LOADPLANNER/LOCAL A Microsoft Windows-based automatic vehicle-loading, -routing, and -*scheduling* system that handles multiple vehicles for inbound *pickups* or outbound *deliveries* between local street addresses. System locates each customer down to individual street address, determines optimal routes and vehicle loading based on weight and volume constraints, customer time windows, unloading times, and total available trip time. Uses an actual road network to calculate routes. This may be comprised of any local road network database, such as MapInfo, ETAK, or Tiger data. Automatically considers unique requirements such as adjusted speed limits, special road restrictions, one-way information, low or weight-restricted bridges. Produces optional driving directions, with driver manifests and loading/*pickup* reports. Hardware: standalone, LAN, or interfaced to AS/400, System/36, RS/6000, others.

INTELLIGENT COMPUTER ENGINEERING, INC. 1 Business Way Hopedale, Mass. 01747 (508) 478-4880 FAX: (508) 478-5519 Contact: Todd R. Leggett

NOMAD-X ROUTING AND *SCHEDULING* SOFTWARE Transportation/distribution management, routing and optimization software, in modular structure to help managers meet critical operational needs while reducing costs and improving customer-service levels. Modules include driver assignment and tracking, vehicle assignment tracking, history capture, multiple depot routing, and dynamic *delivery* locating. System includes mapping functions; customization possible. Hardware required: IBM PC compatible.
(See other listing under Warehouse))

JP SYSTEMS, INC. 925 W. Market St. #200 Greensboro, N.C. 27401 (919) 333-2580 FAX: (919) 333-2584 Contact: J.E. Paquette

SHOPFAX (R) Vehicle information system for fleet maintenance operations. *Schedules* preventive maintenance, tracks vehicle history, parts inventory/re-order, warranties. Hardware required: 486, RISC6000, Altos 3068, PC network.

MANUGISTICS, INC. 2115 East Jefferson St. Rockville, Md. 20852 (301) 984-5488 FAX: (301) 984-5094 Contact: Masao Nishi

TRUCKS (R) Fleet-routing and -*scheduling* system--a decision support tool. Considers real-world constraints like *delivery* windows, service commitments, actual road distances and drive times, and order size. Color graphics enable users to interact with system on-screen to review and modify distribution networks and routes. Background includes highway network with all U.S. interstate and state highways as well as street-level detail to within 30 feet. Hardware required: IBM PC-compatible.

THOMAS M. WILLIAMS AND ASSOCIATES, INC. P.O. Box 7756 Atlanta, Ga. 30309 (404) 874-1298 Contact: Craig Thornton

SIR--SHIPMENT INBOUND ROUTING Software for managing internal inbound freight program, designed to help reduce and control freight costs. Automatically determines least-cost carriers and assists in *scheduling* inbounds. Includes shipper and carrier master lists, load list, and weekly recap and savings reports. Hardware required: N/A.

XATA CORP. 500 East Travelers Trail Burnsville, Minn. 55337 (612) 894-3680 FAX: (612) 894-2463 Contact: Rich Hessler

DISTRIBUTION INFORMATION SYSTEM For use with XATA Driver Computer. System "learns" about every element in your fleet such as drivers, power units, routes, legs and stops, and uses that knowledge and user guidelines to detect and report exceptions. Features real-time fuel management, state fuel tax reporting, DOT driver logs, team communication, driver-incentive program, equipment and cargo management, and dispatch. Extensive reporting allows users to "zoom" into detail as required. Also has capability to combine data with existing systems to eliminate extra data entry. Hardware required: IBM PC compatible and XATA Driver Computer (DC).

EDI ABLE, INC. 20 Valley Stream Parkway, Suite 140 Malvern, Pa. 19355 (215) 644-1231 FAX: (215) 993-0733 Contact: Anne Sommi

FAST-FREDI, FREDI, FREDI DEVELOPER PC software products that support translation and interpretation of all EDI standards. FrEDI can function as front-end or stand-alone application offering 4GL relational database. Includes advanced report generating features, customizable screens/menus,

product picklists, toolkit capabilities, integrated communications,
non-standard transaction support. Reformatting and unattended operations
capabilities allow integration w/in-house systems and file export.
STERLING SOFTWARE The EDI Group 4600 Lakehurst Court Dublin, Ohio
43017-0760 (614) 793-7000 (800) 879-3341 FAX: (614) 793-7092 Contacts: Lee
Bonneau, Doug Stewart
GENTRAN (R) TRANSLATION SOFTWARE Mainframe, midrange, and micro
software for translation of data to and from EDI standard formats, and a
range of telecommunications options depending on individual requirements.
Online file maintenance, online mapping integration allow interface with
internal applications. Table-driven with all tables accessible for easy
customization. Built-in communications module and mailboxing capability.
Hardware: IBM System/370, DEC VAX, IBM AS/400, UNIX (HP 9000, RS 6000)
System/36/38, any DOS equivalent PC.
VII. MISCELLANEOUS
KOSITZKY & ASSOCIATES, INC. 1601 Greenbriar Pl., Suite J Oklahoma
City, Okla. 73159 (405) 692-1683 FAX: (405) 692-1698 Contacts: David
Johnson, Mike Kositzky
GEO WHIZ Graphic pin map and database. Contains over 360,000 miles of
interstate, U.S. highways, state roads, and city streets. Allows users to
map and display locations graphically. Can be used to geocode customer
locations and develop territories based on volumes and geographic area,
print maps. Files can be imported or exported. Optional GWSTREETS for U.S.
Counties features detailed street maps and address lookup. Hardware
required: IBM compatible, 640K, mouse, 6 MB hard disk space.
VANDEMARK PRODUCTS 1307 W. Main St. B2-2 Medford, Ore. 97501 (503)
779-8700 Contact: Robert VanDeMark
BETA COST Computer-based accounting adjunct designed to help
distributors establish overhead rates and determine "outgoing costs" for
each product sold, that is, cost at time of sale. Uses available P&L data
to calculate overhead rates for each phase of distribution operation
automatically, then combines these with sales item data to calculate
accurate "outgoing" unit costs. Daily reports available provide data on
item, product line, sales order, and company profits. Designed for easy
add-on to any existing accounting system. Hardware required: IBM PC
compatible.
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  Computer programs
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 From pitchers to pick-*UPS* across the pond. (can *United* *Parcel*
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 Hailey, Roger
 International Freighting Weekly, n1098, p4(1)
 July 9, 1990
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 TEXT:
       From pitchers to pick-*UPS* across the pond
       HALF Quaker and half marine corps, that is the self confessed
 management style of *United* *Parcel* *Service*. But can it be exported to

Europe?

Attention to detail matters at *UPS*, where million dollar decisions are taken only after long and careful debate among managers at all levels. All are encouraged to have a say.

This management style works, at least in America. There, 273,000 staff handled 2.8 billion package collection and *deliveries* last year, earning $12.4 billion.

Quaker and marine corps. How else do you explain a US$9 million aircraft de-icer at the *UPS* hub in sultry Louisville, backed up by a fleet of snow ploughs that would grace Heathrow?

The reason? *UPS* takes the view that one severe snowstorm could ruin the company's hard-won reputation for reliability.

There is certainly no shortage of investment dollars at *UPS*. Over US$2 billion has been spent on computers and a new fleet of freighter jets.

The big question is whether *UPS* can export its single-minded approach to detail, across the Atlantic to the growing band of European express parcel operators now bearing its name.

As part of a "familiarisation" trip I went on a whirlwind tour of *UPS*, which included a trip to the Louisville air hub and a face-to-face meeting with senior executives at the company's modest headquarters in Connecticut.

Pep talk

The first day involved an eight-hours shift on one of the 116,000 package cars that criss-cross America every working day, visiting one million customers who receive automatic daily pick-*ups*.

I joined driver Bernie Witkowski on truck 105429, belonging to the *UPS* Norwalk Division in Connecticut.

First came the early morning pep-talk given to the 105 drivers. Then accompanied by divisional manager, Gerry Mattes, we took the downtown *delivery* route around well-heeled New Canaan.

Bernie, a former cookie-salesman who joined *UPS* 17 years ago, is never far from his essential clipboard and package trolley as he makes an average 145 *pick*-*up* stops on his route.

Gerry Mattes, who joined *UPS* from college in 1976, has worked his way up from being a pre-loader, the person who, each morning, loads each truck in strict *delivery* rotation for drivers.

The P1000 trip seemed to illustrate that *UPS* has more heavier weight packages, averaging 14 lbs, than next-day document traffic.

The next-day traffic appears to be increasing, but it is also causing problems for the drivers who have to fit pre 10.30am *deliveries* into an already tight *schedule*.

UPS currently makes surprisingly little use of basic technology such as in-cab radios, but relies on old-fasioned, no-nonsense, clipboard and pencils which lead to a lot of repetitive paperwork.

But Bernie and his colleagues might be pleased to learn that *UPS* has a prototype computerised clipboard called *Delivery* Information Acquisition Device (DIAD).

Refined

Designed by *Roadnet*, a software company bought by *UPS* in 1986, DIAD will eventually be issued in a refined form for some 60,000 drivers.

DIAD weighs 3lbs 10oz, has a keyboard and bar-code scanner, and allows a customer signature to be stored in memory for proof of *delivery* documentation.

The Louisville hub - Kentucky airport - was the highlight of the tour. Sixty jets, a mixture of 757,727 and DC-8 freighters converge on Kentucky airport. And *UPS* has invested US$110 million at this hub on facilities alone. Each night 700 aircraft containers are loaded and every hour 120,000 packages are sorted.

For a company that started in 1907 by *delivering* pitchers of beer to hotels and which bought its first Model T Ford six years later, *UPS* has come a long way.

Openness

Its present chairman and chief executive is Kent `Oz' Nelson, a man with a reputation for demanding more openness about *UPS*.

Oz, currently in negotiation with the Teamsters' union, has great faith in his drivers. "They work harder, they work smarter and they're paid well for kit. That is all part of the magic, because when you're *delivering* packages, you're in the business of pennies.

"A few pennies a package makes a big difference to profits when you are *delivering* eleven million packages a day.

"You don't have the luxury of spending a lot of time on each one. You have to handle each one properly, correctly, efficiently and do it right the first time."

Managers at *UPS* are given shares in the company. "When we look for a new district manager, we do not go to the Harvard Business School. We look at our people, the ones who are doing a good job, who want more responsibility and are capable of handling it," says Mr Nelson.

Differences

But could *UPS* be the same company in Europe as it is in the States? Mr Nelson thinks it can be similar. "But you have to accept differences," he adds. "In Italy and Spain we have owner-drivers making *deliveries* instead of our own employees driving *UPS* vehicles. That is a change for us.

"We've had to adjust to whatever is the best way to do business in these countries, and we'll continue to do that where necessary."

But owner-drivers are different from a franchise operation. Would *UPS* buy a franchise parcel carrier in Europe?

"We don't comment on that," said Mr Nelson, with a winning smile.

PHOTO : BERNIE Witkowski with his *UPS* truck which took Roger on a days *delivery* round.

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SPECIAL FEATURES: illustration; photograph
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ABSTRACT: Computer-aided dispatching uses geographic information systems, digital mapping, automated call response and vehicle tracking and computerized information collection to improve response time to emergencies. It can also be valuable for utility and telephone companies in planning and dispatching service vehicles. It can enhance any *delivery* service from express packages to pizza. Reduced response time to fires, accidents and medical emergencies can save lives. More efficient service dispatching and fleet management can save money for public and private companies. Some computer-aided dispatching systems include geographic, address and coordinate information while others permit the user organization to add data specific to its business gathered internally or externally.
TEXT:
     Computer-Aided Dispatching

It's a hot, dry afternoon in mid-summer, and children are playing in the field behind the old schoolhouse. Suddenly, someone spots a trail of smoke wafting through a patch of trees; within minutes, the entire field is ablaze.

As a neighbor gathers the children away from danger, another neighbor calls 9-1-1 to report the fire. Immediately, emergency personnel move into action, monitoring the fire and quickly determining which emergency vehicles to dispatch, as well as the shortest, quickest route to the scene. A mere 20 seconds after the initial call for help is made, a squadron of fire trucks and other emergency vehicles are dispatched and are on their way to fight the blaze.

In time-critical, emergency response situations, such as a fire, the ability to respond quickly and appropriately to a call for help can save people and property. And a new, map-based dispatching technology, being used by fire, police, and ambulance services, is helping to reduce response time to emergency situations from minutes to seconds, while providing vital information about the nature of the emergency to personnel dispatched to an incident.

Emergency road services are also using this technology to locate and dispatch the closest maintenance facility or available tow truck to the scene of a vehicle breakdown. While roadside vehicle breakdowns may not be life-threatening, per se, in some situations they can be very dangerous and require a quick response for service.

But emergency response isn't the only area in which the use of this dispatching technology is proliferating. For situations in which time means money, this technology--combined with *delivery* *scheduling* and vehicle routing and tracking capabilities--is helping to reduce the overall operational costs of vehicle fleet management. *Delivery* companies are using this technology to plan efficient routes and lower their costs per mile; telephone and utility companies are increasing the number of service calls they can handle per day; and pizza is arriving at homes hotter and faster than when *delivery* routes were laid out manually.

What makes these applications possible is map-based, computer-aided dispatching, a combination of technologies which reference an incident--such as a fire, a crime, a vehicle breakdown, or a *delivery* destination--to a geographic location. The location of the incident is then matched to the vehicle that is best able to service the incident.

A route--be it fastest, shortest, or least-expensive--is then selected to connect the service vehicle to the incident location. Proceeding in tandem with call-taking and dispatching are the repetitive tasks of collecting and verifying the data, keeping and updating the records, and monitoring the status of the incident as it is in progress.

A map-based, computer-aided dispatching system helps to automate all of these functions. Such a system typically provides support for call-takers and dispatchers in emergency response applications and routers and dispatchers in fleet management applications. Tracing the progress of the 9-1-1 call in the opening of example of the fire behind the schoolhouse illustrates the components of a dispatch system designed for emergency response applications.

When a 9-1-1 call is made from any telephone, public or private, and if the area in which the call is made is part of the Enhanced 9-1-1 (E9-1-1) dialing system, the call is automatically routed through the phone company's Automatic Number Identification computer, which matches the calling phone number to billing records. The name and address of the caller's telephone is then added to the signal and routed back to the communications center (a public phone is simply given an address).

Pinpointing the Location

As the call-taker answers the telephone, the address is geocoded (the assignment of one or more addresses or establishments to a location and its related latitude and longitude) and located in the dispatch system's digital map database. When the call-taker begins the call, the name and address of the caller is filled in on an Incident Entry Form. In some computer-aided dispatching systems, a second screen displays a map on which the incident location is pinpointed. All of this transpires in less than

two seconds.

The call-taker asks: "What is your emergency?"

The caller answers: "There's a fire behind the old schoolhouse."

With that information, the call-taker enters the incident type, confirms its location "Is it the school on Oak Lane?"), and presses a transmit key to route the emergency to the appropriate dispatcher.

As the dispatcher receives the incident report, the dispatch system checks the fire quadrant in which the fire is located to determine which fire station is closest to the scene. It then checks on the availability of the fire-fighting equipment from data it has received via Mobile Data Terminals (MDTs) located in the vehicles. If the vehicles also have Automatic Vehicle Location devices (AFLs), the actual positions of the vehicles are plotted on the system's digital map. The system also searches its database to check for special hazardous conditions at the address, such as whether explosives or other materials are located on-site.

The dispatcher then alerts the station or the vehicles by printing the incident location and any special instructions on the MDT screen. While the vehicles are en route to the scene, they are given additional information on the status of the blaze, as well as routing instructions to avoid traffic delays.

Rapid identification of the location of an incident is the key to rapid response. Therefore, a digital map, which is geographically referenced to latitude and longitude and which contains associated street addressese and major landmarks, is the heart of a computer-aided dispatch system. Some vendors of turnkey systems, such as Etak (Menlo Park, CA), *deliver* the system with their own map database (Etak's is from its MapBase library). Other vendors, such as Intergraph (Huntsville, AL), can use digital maps prepared by others, including the client's own data.

This map data must be topologically structured. That is, the points and lines on the map that define streets, landmarks, and boundaries must be logically related to each other so that actual street names and addresses can be referenced accurately to a geographic location. As such, US Census Bureau GBF/DIME (Geographic Base Files/Dual Independent Map Encoding) files are a common source of address data for dispatching applications. These files contain information describing the street network and other map features in records representing the segments of the features. Each record contains the segment name, address range, and ZIP code. Node numbers for intersections are referenced to x,y coordinate data that is, in turn, referenced to latitude and longitude.

For vehicle tracking applications using AVL devices or vehicle routing techniques, road geometry must be accurate and positionally precise-within 15 to 30 feet of ground truth. Two technologies are used for vehicle tracking: autonomous and signal-dependent. Autonomous devices, such as Etak's Navigator, reside in the vehicle and use wheel sensors to gauge distance travelled, a compass for direction, and an on-board database for map-to-ground matching.

Signal-dependent systems generally use Loran C technology. Loran C uses positional information transmitted from land-based radio towers. The vehicle's AVL device receives the transmissions and triangulates (calculates latitude and longitude) its own position.

Map-based, computer-aided dispatching systems are being used by numerous public service and fleet management companies nationwise. For instance, PRC Public Management Service, a wholly Management Service, a wholly owned subsidiary of Planning Research Corp. (McLean, VA), has installed over 80 computer-aided dispatching systems for police, fire, and emergency medical services. PRC is a turnkey vendor and systems integrator. Each PRC system is tailor-made for the client, combining hardware and software, dispatching terminals, radio equipment, MDTs, and AVLs. PRC dispatch software runs on Digital Equipment Corp. (Maynard, MA) minicomputers and workstations.

One of PRC's installations is the Fairfax County, Virginia Public Safety Communications Center. PSCC's $11.5 million emergency response system includese 12 call-taker, 12 dispatcher and, two supervisor applications running on two VAX785 and two PDP 11/44 minicomputers. Six

hundred MDTS reside in police, fire, and rescue vehicles. E9-1 lines alone handle over 600 calls per day.

Each call-taker's station has two terminals--one for data entry and another for map display. After a caller's address is validated, the map system displays the incident location at an appropriate scale to see surrounding streets. The call-taker uses that map display to verify the location of the incident. (Fairfax hasn't installed AVLs in its vehicles, so its system can't display vehicle location.)

Albuquerque Ambulance (AA) in New Mexico is another user of a map-based, computer-aided dispatching system. When faced with the problem of increasing capacity and improving response time for its Emergency Medical Services without increasing staff size or adding new equipment, AA decided that the only way it could save time is at the start of a call.

"You can't drive to make up time," says John Tibbetts, AA system status manager. "If you can save 3 to 4 minutes at the beginning of very call by automatically locating and assigning an emergency crew, you not only improve overall response time, you save lives. In a cardiac arrest case, those 3 to 4 minutes are the difference between saving a life and losing one."

Three years ago, AA installed Etak's Emergency Response System CAD, including workstations, the Navigator on-board vehicle location device, and an EtakMap of the city. Eleven ambulances are fitted with the Navigator; a map display system with the Navigator screen also functions as an MIDT, displaying and transmitting messages from and to the dispatching center.

Albuquerque's dispatching center houses two Etak Dispatch workstations, each consisting of a Compaq 386 computer with dual monitors--one that displays a map and shows all emergency service vehicles with their number and color-coded status (en route; at scene; departed scene; at hospital) and another that is used for textual data, including summaries of a vehicle's status, incidents in progress, and call-taker menus. When a call comes in, the incident location is automatically geocoded and displayed on the graphics terminal, and a menu appears on the text screen. The dispatcher determines if the call must be answered immediately, or whether it can be *scheduled* for a later *pick*-*up*. In an emergency, the dispatcher sees which vehicle is closest to the incident and dispatches the call to the selected vehicle.

All communication between the vehicle and dispatch center is digital. Every 3/10 of a mile or 15 minutes, the location of each vehicle is sent to the center via a UHF radio frequency; another frequency is used to send messages to the vehicles. When an emergency is dispatched to an ambulance, the incident location is flashed on the Navigator screen. The driver sees its location in the middle of the screen and uses the map as a visual guide to drive to the emergency.

Tibbetts says that since the Etak system was installed, Albuquerque Ambulance has been able to handle 20 percent more call volume without adding a new crew. The key to this success, he says, is automatic geocoding and Etak's two-way AVL capability. "Emergency medical service is a complex business," he says. "It's difficult to find good paramedics. It's even more difficult to find crews who have an expert knowledge of all the streets in a city the size of Albuquerque. We estimate that our computer-aided dispatch system paid for itself in [under] a year."

Intergraph is a new vendor in the computer-aided dispatch systems market. Its Dispatch Management System, announced last August, includes graphics tools and RIS, Intergraph's relational interface system. RIS offers access to databases, records, and AVLs and MDTs.

The DMS consists of five software modules: I/Dispatcher, I/Calltaker, I/Tracker, I/Informer, and I/Messenger. I/Dispatcher monitors vehicle and incident status and type and provides automatic dispatch recommendations based on incident and vehicle location, type and availability, and other pertinent factors. I/Calltaker providies capabilities for entering information about an active incident. I/Tracker and I/Messenger provide communication support capabilities to several third-party MDTs and AVLs. And I/Informer allows access to data stored on other computers in different data formats.

The American Automobile Assoc. has a strong interest in computer-aided dispatching. AAA has 31 millio members in the US and Canada; for an annual fee, a member receives free emergency road service (ERS) in case of a vehicle breakdown. Last year, AAA clubs respondend to over 22 million ERS calls through AAA's network of 15,000 contracted service facilities with over 31,000 service vehicles.

JeffMischke, director of Club Information Systems, says that AAA is constantly looking for ways to improve services to members while keeping the cost of those services--and therefore, membership fees--as low as possible. By enhancing its current ERS systems with computer-aided dispatch capabilities, Mischke believes that AAA can achieve both objectives.

"Reducing the response time from when a call is made by a member to when an ERS vehicle arrives on the scene not only minimizes the member's inconvenience, but also takes the member out of a potentially dangersou situation," says Mischke. He cites an example from the British Columbia Automobile Assoc. (BCAA). With a rudimentary computer-aided dispatch system that allows a dispatcher to match a callerhs location to contractors' service quadrants and digitally signal a driver's MDT, BCAA was able to respond to 16 percent more light service calls (flat tire, fuel *delivery*) and 8 percent more two service calls without adding equipment to the fleet.

Mischke believes that the seconds saved in using computer-aided dispatch technology result in productivity improvements over time. A group of AAA clubs will soon install computer-aided dispatch systems in their ERS dispatch centers and MDTs in their contractors' vehicles. Initially, there will be neither a visible map display nor AVLs. But Mischke sees their inclusion as a desirable feature in future AAA dispatch systems.

The major difference between ERS dispatch systems and fleet management dispatch systems is the latter's incorporation of a routing and *scheduling* component. Routing applications require a much more robust digital map than do vehicle tracking applications. Each link in a topologically structured network must contain data on time to travel or special restrictions that must be enforced, such as height, weight, or speed limits and time-of-day prohibitions. A simple routing calculation for one vehicle attempting to move from one point to another, although not computationally trivial, is easily managed by simple routing software. A complex routing characteristic of fleet management consists of multiple available vehicles, multiple vehicle types, variable driver starting times, preferred and maximum route duration, time window requirements, and load characteristics. Unscheduled stops may have to be inserted on even a pre-planned route.

Roadnet Technologies (Hunt Valley, MD), a United Parcel Services (*UPS*) Company, offers its *Roadnet* system for fleet management applications. *Roadnet* is a stand-alone, PC-based, decision-support tool designed to help a router select the most efficient way to load and route *delivery* vehicles.

Roadnet created a street-level base maps for its system by digitizing from US Geological Survey (USGS) 1:24,000 scale topographic series maps. GBF/DIME files have been combined with the digitized street data to merge address data and code intersections with latitude and longitude locations. The digitizing process is now complete for 50 of the largest metropolitan areas in the US and Canada, including all of the primary state and interstate highway networks. *Roadnet* doesn't sell its digital database independently of its system.

System set-up includes contracting *Roadnet* Technologies to geocode all customer locations and associated data, such as standard *delivery* items, *delivery* time windows, and hours of service. Every customer has a unique identification number. When the system is put into use, daily orders are either keyed into the system or downloaded from a central database. Proprietary algorithms are used to calculate clusters of *deliveries* and stop order sequences.

According to David Carp, *Roadnet*'s national sales manager, automated fleet management offers the added benefit of driver accountability. "With manual routing and *scheduling*, a driver goes out with a day's orders and comes back, but there is no control over the driver

movements," he says. "With automated fleet management, the driver is givne a sequence with estimated times between stops and completion times. Dispatchers know approximately where a driver should be at all times."

UPS is using a special version of *Roadnet*, and one *Roadnet* division works only on the *UPS* application. Around the time *UPS* purchased *Roadnet*, it acquired II-Morrow (Salem, OR), manufacturers of an AVL system. *Roadnet* and II-Morrow, along with *UPS*, are building the next generation of fleet management systems for *UPS*.

Mobile Electronic Tracking Systems (METS, Indianapolis) is another vendor of fleet management systems. The METS system includes a proprietary in-vehicle computer unit, called Tracker, which contains an AVL device and input/output ports for MDTs and other peripherals. Tracker's AVL uses Loran C to position the vehicle in geographic space and relays the position back to the central dispatching system. METS does not sell its own computer-aided dispatch system, but provides an interface capability to other systems.

METS adds a Vehicle Management System module to a computer-aided dispatch system so that a display is available to monitor fleet activity. Its RoadRunner module performs routing, *scheduling*, and dispatching. Point-to-point route maps are displayed as an overlay to a street-level map. METS purchases maps for its clients from other companies, including Geographic Data Technology (GDT, Lyme, NH).

Routing Technology Software Inc. (RTSI, Vienna, VA) is another vendor specializing in the development of routing and *scheduling* dispatch systems. RTSI's Roadshow system is designed to find the most cost-effective routes for clients' vehicles, enabling them to reduce distribution costs. This is accomplished through a program that processes the *delivery* order and evaluates such factors as actual mileage, road speed, rush-hour or weather slowdowns, vehicle capacity and operating costs, and driver wages. These routes are then displayed on a proprietary video system that includes street maps and data screens. RTSI's arrangements with map publishers ensure that Roadshow's maps are up to date and accurate.

Whether a map is displayed or used only for processing a match between a vehicle and an incident, computer-aided dispatching is not possible without a geographically accurate and precise map database. Companies such as Etak, GDT, Navigation Technologies (Sunnyvale, CA), MapInfo (Troy, NY), and Spatial Data Sciences (McLean, VA) are creating street-level map databases which are highly detailed and geographically precise. Their job, and that of other database producers, is being made easier by a wealth of new data coming from the public sector and from the introducton of more powerful computer mapping tools for data conversion.

Digital map data, vehicle tracking and communications systems, and functional software--the components of computer-aided dispatch--are now available. The benefits of this technology in fleet management and emergency response applications are demonstrated. Expansive growth in computer-aided dispatching appears inevitable.

Michael L. Sena is president of Matrix Consultants (Boston).

SPECIAL FEATURES: illustration; photograph
INDUSTRY CODES/NAMES: CMPT   Computers and Office Automation
FILE SEGMENT: CD File 275

TEXT:
    Good things come in small packages
    Intensifying competition is driving the big parcel express carriers to broaden their vision and offer a wider selection of services
    Reliable overnight parcel *delivery* service may be good, but it absolutely, positively, has to be better. Responding to purchasing and distribution professionals and others who increasingly see transportation as a critical strategic tool, the major U.S. players--Federal Express, *United* *Parcel* *Service*, and Airborne Express, along with the U.S. Postal Service--are rapidly introducing services that promise to translate the fundamentals of speed and information into a powerful competitive edge. Their goal: To make premium transportation a way to cut costs and improve service.
    What's out there? To start with, carriers are stressing basic business--good service at lower costs. And they market their services based on their strengths. Thus, *United* *Parcel* *Service* touts the fact that it provides next-day *delivery* on a huge portion of the 11 million packages it handles each day at rates that are unmatched, while Federal Express points out that it tracks each of the million packages it handles every day.
    Carriers are also launching "next-generation services"--including such tasks as warehousing, distribution, and assembly--under the rubric of logistics. And they are all competing on a global basis.
    The growing competition does, of course, hold dangers. The more package express carriers attempt to extend their services, the more they risk reaching beyond their grasp. It's a risk, though, that most feel they must take.
    The business world is changing, the arguments goes, and the package express industry had better change with it. The changes, in fact, offer businesses designed around fast *delivery* of small quantities. FedEx is stressing "time-based strategies" that help its customers "shrink time throughout the production cycle."
    As a result, FedEx has begun an ambitious effort to win more time-sensitive business via its new Business Logistics Services (BLS) division. The new division evolved from the FedEx Parts Bank, which has been around for 15 years. The Parts Bank stores critical inventory for customers, many in the high tech and medical industries, for rapid shipment to customers. The Parts Bank eventually began to offer other services, including tracking returns, performing some assembly, and other routine distribution for customers who did not want to invest in a distribution network.
    Michael P. Carrasco, managing director of sales and marketing for BLS, says it has the dual advantage of using FedEx's vast network while having the freedom to develop services customers want. "We can take advantage of the mother ship, but we're quite entrepreneurial," he says.
    BLS managers believe they have something to offer both big and small businesses. On the one hand, the unit offers special advantages to startup operations, allowing them to gear up without investing in a distribution network. At the other end of the spectrum are large firms that will be able to use BLS for selective distribution tasks.
    BLS, like its parent, Federal Express, builds its service on information. In addition to having access to FedEx's vast and sophisticated computer system, BLS now has its own mainframe system (also used by Parts Bank) dedicated to its customers.
    Much of BLS is designed for post-manufacturing operations, but it also can and does handle inbound components movements for manufacturers. In fact, much of what FedEx executives talk about--reducing inventory, cutting cycle times, forming strategic partnerships, and reducing the number of suppliers--sounds especially familiar to purchasing executives.
    FedEx's extensive international network, plus its ability to help customers with the arcane world of importing and exporting, provides another substantial service beyond transportation. Further, BLS

increasingly plays a third-party role in working with carriers in other modes. "We're not even tied to Federal Express," Carrasco says. "If a competitor has the solution we need, we'll use it."

Charles M. Kirk, managing director of operations for BLS, cites one U.S. computer company that relies on BLS for *delivering* electronic sub-assemblies from the Far East as a key part of its just-in-time system. FedEx brings the products in on its aircraft, clears them through customs with the help of a broker, and manages truck transportation to the customer's dock. "We add a lot of value just in the administration and by ironing out discrepancies," he says.

Isn't there a danger in trying to be all things to all industries? FedEx officials agree there is. But they note that BLS intends to concentrate on only a few industries at any one time and attempt to design programs whose basic structure can be used by more than a single business.

Another hurdle. FedEx's sales force will have to persuade sometimes reluctant traffic managers that the increased cost for premium transportation may be a good idea. For that reason, BLS targets its sales pitch at purchasing managers and upper-level executives who can see that the gains in reduced carrying costs and increased inventory turns might make using BLS worthwhile.

Kirk recognizes that buyers are less interested in the mode than the reliability of *delivery*. "We're selling people and management systems," he says. "We're taking out the variance."

Federal Express is not alone in advancing service levels and buying up foreign businesses. The small package giant *United* *Parcel* *Service* brings deep pockets and savvy management to the competition.

The combined ground volume of *UPS* dwarfs all competitors. Shippers move 11 million packages a day via *UPS* ground service. While most do not consider that an express service--and *UPS* has never marketed it that way--it is a next-day service for many markets when shipping from and to major metropolitan areas. The company says close to 45% of its ground packages are *delivered* the next day. Combine that with its rock-bottom cost and it becomes a very competitive service when there's any flexibility in the shipping *schedule*.

UPS provides customers with pamphlets describing its next-day areas for each major city. Generally, these are areas that fall within 150 miles of the origin. The savings over air express is considerable.

UPS base prices are the lowest in the business, but it has begun to do more. In a service that breaks with tradition, *UPS* has begun offering its bigger customers volume discounts. Its Hundredweight program gives discounts to multiple packages going from a shipper to a single consignee on the same day, as long as the shipment is over 200 pounds. "We give them some of the cost advantages," says Richard Greene, *UPS* vice-president and national marketing manager. "Customers have been using us for larger and larger shipments and asking why the rates were high. We're responding to our customers." The program is offered in 48 states as an interstate service.

Covering ground. Another program, dubbed GroundSaver, offers discounts to shippers who move more than 250 pieces a week, with a minimum of $3 revenue per package and more than 50% commercial receivers. It is offered in 115 cities. The terms differ from customer to customer, depending on volume and other criteria.

But *UPS* is hardly resting on that. It has made major capital investments in aircraft and an air freight system for the domestic market and is rapidly extending its reach around the world. It is carefully adding to its ability to provide on-demand *pickup* for air parcels, challenging Federal Express right at its heart.

Further, *UPS* has abandoned its low tech heritage with a vengeance. The company is building an $80 million computer and telecommunications center in Mahwah, N.J., to provide support for all operations worldwide. The facility, which will essentially replace existing computer operations in Paramus, N.J., is expected to begin operating in 1991.

UPS's high tech efforts also extend to its fleet. *Roadnet* Technologies, a Baltimore firm specializing in mapping technologies, and

IImorrow (pronounced "tomorrow"), a Salem, Ore.-based specialist in radio technology, are developing systems to improve dispatching and vehicle tracking and to provide on-board communications with every vehicle.

In August, *UPS* announced that its international network now reached 175 countries and territories. It claims most international shipments will be *delivered* within two or three days. "We're truly in the international business now and are moving ahead as fast as we can," Greene says. He hopes the company will soon be able to offer service to Eastern Europe.

UPS air *delivery* volume, both next-day and second-day air, is now 650,000 parcels and documents a day, making it the number-two parcel express carrier, behind Federal Express.

Greene expects the business, both international and domestic, will grow rapidly in the next few years. International growth is expected to be particularly strong. *UPS* is ready for it. For international shippers, *UPS* has developed its International Shipments Processing System, which speeds customs clearance and provides better control of shipments.

"The courier industry is good at clearing documents," says Greene, "but packages are another challenge. ISPS is the best in the business at clearing packages."

With all that *UPS* and FedEx have to offer, what can the number-three player do to compete? Airborne Express thinks it has one major advantage over its competitors: It operates its own airport.

That alone doesn't give it a boost--few buyers worry about where the planes land as long as the package is on time. Airborne, which has carved out a niche specializing in business-to-business express *delivery*, is taking FedEx's BLS one better, at least in one way.

Airborne has begun operating a "commerce park" on 1,000 acres around its hub in Wilmington, Ohio. Kent Waggoner, director of marketing logistics services for Airborne, says the park can accommodate both businesses that run their own operations, but utilize the carrier's regular services, and those that turn distribution operations over to Airborne.

"It's primarily geared to companies that are distribution-intensive who rely on premium transportation," Waggoner explains. He says Airborne is convinced that a growing number of companies want to out-source logistics functions rather than make the investment in people and assets for in-house operations. "They're realizing how important distribution is," he says. "We're trying to capitalize on that."

Like both FedEx and *UPS* managers, Waggoner contends that premium transportation is playing a bigger role in planning, as business managers look at total logistics costs rather than just the cost of transportation.

The logistics services grew out of Airborne's unusual position of owning and controlling its hub airport. "It was a natural extension of that to offer third-party logistics," says Waggoner.

Waggoner argues that customers can derive special advantages by locating at its hub. Not the least of those is the ability to make shipping decisions as late as 2 a.m. Eastern time. "Companies can add eight hours to customer service," he says.

And, like the BLS system, locating inventory at an air express hub allows reduction or elimination of redundant inventories at diverse locations around the country. "You're stocking locations can go down to one," he says.

A large portion of Airborne's customers come from electronics and health care industries: Their goods tend to be high value and, when they're needed, the need is often urgent. "If you're carrying high-value inventory, you want as few items as possible," Waggoner says.

Waggoner says one trend that is growing in the business is the demand for same-day services. In response--and in contrast to the one-location concept--Airborne runs a critical parts operation in its hub and at several operations, called Stock Exchanges, in several locations throughout the country. He expects the company will have a dozen of those operations up and running by year-end.

By locating them at key airports, near Airborne's customers' own key customer bases, Airborne can offer rapid regional *delivery* by truck or next-flight-out service on airlines. Earlier this year, Airborne bought

another company, Sky Courier, which specializes in same-day *delivery*. Sky Courier uses *scheduled* airlines plus couriers at each end to provide door-to-door same-day service.

The express services fill modern business needs, Waggoner argues. "It falls in line with JIT, stockless inventories, and keeping inventories low," he says. "The service tradeoff will be premium transportation."

Unlike the big three private firms, the Postal Service is not getting into the third-party logistics business. But it is adding services to attract business-to-business Express mail users.

Robert E. Michelson, general manager of the Postal Service's expedited mail services division, stresses that its services are available to all segments of the marketplace, but adds that the bulk of Express mail comes from business-to-business correspondence. "We've taken steps over the last two years to make service more appealing to the business sender," Michelson says. The major step: The Postal Service began dedicated air transportation of express and priority mail through a contract with a private air carrier, first Evergreen International Aviation in 1987, and currently, Air Train Inc.

The award to Air Train, a subsidiary of Consolidated Freight-ways, generated some controversy when Evergreen and others challenged the procurement process, but Air Train continues to perform the service.

First-class *delivery*. Another competitive step: The Postal Service cut the rate for Express letters to $8.75 for domestic *delivery* and $10.75 for foreign *delivery*.

The Postal Service also has begun on-call *pickup*, a service it will continue to expand over the next year. It is already available in most major downtown locations. The service costs $4 per stop, no matter how many envelopes are involved.

Another edge over the competition: The Postal Service *delivers* Express Mail seven days a week.

Thus far, Express Mail services have attracted primarily letters and documents: 72% of Express Mail packages in fiscal 1988 weighed 8 oz. or less and 95% weighed 5 lb. or less. But Michelson thinks the Postal Service can challenge for a share of the parcel business.

"That requires two service features," he says; "one is on-call *pickup* and the other is tracking." On-call *pickup* is nearly fully in place; a nationwide tracking system is expected to go on line in 1991.

That will add to the diversity of services that Michelson believes is a major Postal Service strength. "When we talk to our customers one on one, we analyze what they need and help them make a choice," he says. "We think we can *deliver* the service they need no matter what speed they need."

While FedEx, *UPS*, Airborne, and the Postal Service battle over the domestic market and make strides overseas, a couple of package express companies already well established in foreign markets--notably TNT and DHL--are after a bigger piece of the market here.

TNT Skypak, a subsidiary of Australian transportation giant TNT Ltd., is a good example. TNT Skypak provides international services in the U.S. Its U.S. revenues for the fiscal year ending in June reached $100 million, a gain of 25% over the previous year. It has been in the U.S. market for about seven years. "It's kind of a last frontier for TNT," says Marie Vigliarolo, vice-president of marketing for TNT Skypak.

TNT could become a major domestic player at some time. It already owns a piece of Airborne, and it's no secret that it is interested in acquiring the company. In the meantime, it is a major competitor on the international market, operating 727 company-owned branches and reaching 184 countries. Fifteen percent of its worldwide volume is *delivered* to the U.S.; 20% of the volume originates here.

The company offers several levels of service, starting with its top-of-the-line (and very expensive) Diplomat service, which provides an on-board courier who hand-carries a parcel to its destination. Below that, it offers services with guaranteed *delivery* times, call backs after *delivery*, priority service pushing parcels to the front of the *delivery* queue, and regular *scheduled* service. Another service, TNT Expressair, is geared to heavy-weight freight, although its tariff starts for shipments as

small as 10 lb.

TNT's mix of services also include *pickup* and *delivery* options, providing airport-to-airport, airport-to-door, or door-to-airport alternatives.

Vigliarolo says, "We listen to our customers' needs and sell them what they need." She says the company is actively building its U.S. presence. "We have 35 branches now," she says. "We're beefing up our security staff and beefing up operations for *pickup* and *delivery*."

PHOTO : No retreat, no surrender: Package express competition has gone global. United Parcel

PHOTO : Service reaches 175 countries, and Flying Tigers gave Federal Express a worldwide network.

PHOTO : Their competitors are responding aggressively.

PHOTO : Airborne Express is not alone in offering distribution services. But owning an airport and

PHOTO : adjacent commerce park gives it an advantage.

PHOTO : TNT Skypak, from its European hub in Cologne, is after a bigger bite of international

PHOTO : business to and from the United States.

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SPECIAL FEATURES: illustration; photograph
INDUSTRY CODES/NAMES: TRAN   Transportation, Distribution and Purchasing
DESCRIPTORS: Air freight--Management; Parcels-post--Management; Courier services--Management
SIC CODES: 4513 Air courier services; 4311 U.S. Postal Service
FILE SEGMENT: TI File 148

5/9/20   (Item 8 from file: 148)
DIALOG(R)File 148:Gale Group Trade & Industry DB
(c)2003 The Gale Group. All rts. reserv.

03464257   SUPPLIER NUMBER: 06240889   (THIS IS THE FULL TEXT)
Big changes at Big Brown. (*United* *Parcel* *Service*) (Corporate
  Performance) (company profile)
Labich, Kenneth
Fortune, v117, n2, p56(5)
Jan 18, 1988
DOCUMENT TYPE: company profile   ISSN: 0015-8259   LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT
WORD COUNT: 2942   LINE COUNT: 00229
          COPYRIGHT 1988 Time Inc.

SPECIAL FEATURES: illustration; photograph
COMPANY NAMES: *United* *Parcel* *Service* of America Inc.--Management
INDUSTRY CODES/NAMES: BUS   Business, General
DESCRIPTORS: Management--Case studies; Courier services--Management;
  Postal service--Management
SIC CODES: 4513 Air courier services; 4311 U.S. Postal Service
FILE SEGMENT: MI File 47

5/9/21   (Item 1 from file: 483)
DIALOG(R)File 483:Newspaper Abs Daily
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04986555
Waiting for the Cable Guy? Software Can Save the Day   ,
Narisetti, Raju
Wall Street Journal, Sec B, p 12, col 3
Apr 2, 1998
ISSN: 0099-9660   NEWSPAPER CODE: WSJ
DOCUMENT TYPE: News; Newspaper

LANGUAGE: English   RECORD TYPE: ABSTRACT
LENGTH: Medium (6-18 col inches)

ABSTRACT: MINEOLA, N.Y. -- What do you get when a Yale computer-science
professor forms a software company with a former student turned Bell Labs
researcher and a roommate from his Berkeley days, a 1960s radical who
became treasurer of an Israeli kibbutz? The three formed Lightstone Group,
a tiny, closely held software maker that is holding its own in the arcane
field of programs for routing and *scheduling*, a world dominated by large
players such as the *Roadnet* Technologies division of *United* *Parcel*
Service of America Inc., Manugistics Inc. and Descartes Systems Group
Inc. Lightstone, based in this Long Island town, sells Rimms, a PC-based
program that allows companies to arrange *pickups* and drop-offs
efficiently and to *schedule* service calls. Whirlpool Corp. uses it to
manage all 425 of its U.S. service technicians from a single site in
Knoxville, Tenn.; New York Times Co. uses it for national newspaper
distribution; it helps Oakwood Medical Labs in Detroit *pick* *up* blood
samples from 1,000 clinics and hospitals each day; and it allows Sleepy's,
a mattress chain based in Bethpage, N.Y., to promise quicker home
delivery than its competition.

DESCRIPTORS: Corporate profiles; Software industry; Routing
SPECIAL FEATURES: Illustration
COMPANY INFORMATION:
Lightstone Group

 5/9/22   (Item 1 from file: 541)
DIALOG(R)File 541:SEC Online(TM) Annual Repts
(c) 1987-1997 SEC Online Inc. All rts. reserv.

0772637
UNITED *PARCEL* *SERVICE* OF AMERICA INC   - 1993 Annual Report
400 PERIMETER CENTER TERRACES NORTH
GREENWICH OFFICE PARK
ATLANTA, GA 30346
Telephone: 404-913-6000

Publication Date: 12/31/93
Report Number: 0129927, Page 20 of 42,   TEXT page
Filing Date: 04/14/94
Fiscal Year End: 12/31

Exchange: PVT   Ticker Symbol: 000
State of Incorporation: DE

CUSIP Number: 91130810
D-U-N-S Number: 00-699-1681

Primary SIC Code: 4311 (UNITED STATES POSTAL SERVICE)

Commission File Number: 0-4714
IRS Employer ID: 95-1732075
Author: SECURITIES & EXCHANGE COMMISSION 04/14/94

Auditor: DELOITTE AND TOUCHE

Section Headings: COMPANY REPORT

TEXT:
SOURCE PAGE 19]

To further profit from the trend to outsourcing, Truck Leasing has

established programs with *UPS* Worldwide Logistics to share prospects and
conduct joint marketing efforts.

Anticipating further gains in its existing markets and expansion driven
by its customers' growth, *UPS* Truck Leasing has set increased profit
goals for 1994 and beyond.

(PHOTO OMITTED: "Mechanic STAN ARMSTEAD drives vehicle into *UPS* Truck
Leasing's new Doraville, GA, facility for servicing. BELOW: II Morrow
is shifting its focus from a manufacturing operation to the development
of prototype products, such as these - the Feeder In-Vehicle Information
System and an in-vehicle data communications terminal used by our On
Call Air *Pickup* Operation")

ROADNET, II MORRO SEEK NEW MARKETS

Roadnet *delivered* new DIAD software that supported *UPS* Total Track,
our
package tracking system, and provided the capability of printing
delivery records for consignees who have contracted for that service.
systems were developed that bring greater efficiency to our feeder
operations through better planning and trailer utilization.

Meanwhile, revenue for Roadner's commercial products increased 19
percent over 1992. The Maryland-based subsidiary has more than doubled
its profits in the past years increased its customer based to over 400
and established its routing and *scheduling* system as the dominant
product in its market.

 5/9/23   (Item 1 from file: 637)
DIALOG(R)File 637:Journal of Commerce
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UPS Uses Information Technology As Major Competitive Advantage
JOURNAL OF COMMERCE (JC) - April 06, 1992
By: TONY SEIDEMAN Journal of Commerce Staff
Edition: Five Star Section: TECH Page: 3B
Word Count: 855

TEXT:
Transportation companies looking to break out from the pack are turning to
information technology as the weapon of choice to slay their competitors.

     "One of the most powerful competitive tools we have today is
information its acquisition, its control, its distribution," said Douglas
C. Fields, vice president, telecommunications, information services,
United *Parcel* *Service*.

     With investments of at least $2 billion in information processing
since 1985, Atlanta-based *UPS* has embraced high technology with a fervor.
The company employs 3,000 people in this area, up from about 100 in 1983.

UPS as a company has been dramatically transformed over the past five
years," Kent C. Nelson, the company's chairman and chief executive, said in
a recent speech.

     That transformation has touched every area of *UPS*. Computers have
been the main tool behind it, and the dollars will continue flowing, *UPS*
 executives said.

     "We probably invest on the order of $200 million to $300 million a

year in technology," Mr. Fields said. The money goes into processing, communications, storage and software technology, "and the skilled people that can develop and operate it."

Payoffs from the technology have come in two distinct ways, said Frank Erbrick, senior vice president, information services. Productivity increases are the most obvious area.

Personal computer-based key entry systems enabled *UPS* to reduce staffing by 10 percent or better, Mr. Erbrick said. Sophisticated portable computer systems that electronically record *delivery* receipt signatures both have reduced staffing needs and enabled the company to improve customer service.

An even more important return on *UPS*' technological investment is the dramatic improvement in its ability to meet the tremendous demands of a rapidly changing marketplace, Mr. Erbrick said.

UPS currently moves 750,000 packages a day through its daily air *delivery* system. Package tracking is an essential ingredient of such a system.

Without the company's electronic infrastructure, *UPS*' swift move into the overnight *delivery* marketplace would have been impossible, Mr. Erbrick said. In fact, without its electronic infrastructure, *UPS* simply wouldn't have been able to keep up with the competition, he said.

Air express users such as *UPS* and Federal Express Corp. rely on three different kinds of computing power:

* Huge, centralized mainframe systems crunch hundreds of millions of pieces of information each day.

* Distributed systems, consisting mainly of personal and minicomputers tied together in local networks, handle the data processing needs of regions and offices.
* Portable data processing power in hand-held and truck-mounted computers provides up-to-the-second information on package *pickups* and *deliveries*.

UPS has massive power in all three areas, with its mainframes running what is probably the largest relational database in the world.

Relational databases are sophisticated software packages that analyze information by looking at relationships between different pieces of data.

"Relational databases give you huge flexibility in terms of accessing the data and manipulating it," Mr. Erbrick said.

If customers ask unusual questions, *UPS* can answer them quickly and effectively, Mr. Erbrick added.

UPS has more than 32,000 personal computers. These are tied together in about 1,200 local networks, he said.

Many of the company's biggest investments have been in the communications systems needed to tie its different computers together. Upsnet, a global telecommunications service that carries voice, data, facsimile, video and still images between the company's operations, costs $50 million to put together.

The company's International Shipments Processing System uses software that can be put to work easily in any country, Mr. Erbrick said. Now *UPS* is preparing to put another $150 million into the service.

Massive amounts of money have also gone into *UPS*' portable data processing power. The company has invested tens of millions of dollars in its *Delivery* Information Acquisition Device.

Thousands of drivers have these hand-held data collection units that not only give package information, but also record an exact image of the customer's signature.

To get information from the DIADs to *UPS*' computer system, the company is putting another $100 million into equipping its trucks with mobile data collection and transmission units, Mr. Erbrick said.

Ambitions for electronic links go well beyond *UPS*' borders. The company is aggressively establishing electronic ties with its customers.
"I've got hundreds and hundreds of my customers that I'm connecting electronic data interchange to," Mr. Erbrick said.

Other research and development projects include high-density bar codes and electronic imaging systems that work with pictures of documents, cutting out the need to handle and store paper.

UPS also has two subsidiaries dealing in information services: *Roadnet* Technologies Inc., Baltimore and II Morrow Inc., Salem, Ore. *Roadnet* specializes in computerized routing and *scheduling* software. II Morrow's focus is vehicle-locating systems and navigation technology.

More of these new units are possible, *UPS* executives said. Candidates range from logistics management to telecommunications services, with customers piggybacking on the company's global electronic web.

Improving productivity was a primary goal behind *UPS*' initial electronic investments. But that changed long ago, Mr. Fields said.

"It's not only an orientation around having the most economical operation any more. It's also being able to recognize and capitalize on opportunities when and where they occur without geographic limitations."
CAPTION:
Photo

$100 MILLION AT WORK: *United* *Parcel* *Service* Inc.'s new data processing facility in Mahwah, N.J.

DESCRIPTORS: TRANSPORT; TELECOMMUNICATION; TECHNOLOGY; COMPUTER; *UNITED* *PARCEL* *SERVICE*; COMPETITION; INVESTMENT; INFORMATION; US
COMPANY NAMES (DIALOG GENERATED): Federal Express Corp ; II Morrow Inc ; *Roadnet* Technologies Inc ; *UPS*

5/9/24   (Item 2 from file: 637)
DIALOG(R)File 637:Journal of Commerce
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UPS TESTS TRACKING, COMMUNICATION SYSTEMS
JOURNAL OF COMMERCE (JC) - TUESDAY March 14, 1989
By: MARK W. LYON Journal of Commerce Special
Edition: FIVE STAR Section: AVIATION Page: 5B
Word Count: 739

TEXT:
SAN FRANCISCO - *United* *Parcel* *Service* is now testing computer systems that will enable it to *pick* *up* parcels on the same day it receives the requests, rather than the next, as it does now.

The enhanced capability should make *UPS* more competitive with some local messenger services, other express package companies and less-than-truckloa d (LTL) truckers.

Competitors Federal Express Corp. and Roadway Package Systems both use vehicle tracking to route drivers to customers who call for an unscheduled, on demand-*pick*-*up*.

The new systems began as part of a five-year $1.4 billion technology upgrade that included developing a low-cost capability for same-day *pickup* , according to Gene Hughes, the company's strategic planning manager.

"These (systems) were very new for *UPS* ," Mr. Hughes said in a telephone interview. "We had developed a very efficient 24-hour service and didn't need on-demand until we got into the air express business."

To equip its 50,000 brown trucks with off-the-shelf tracking and communications would have cost about $5,000 a vehicle, or $250 million in total, Mr. Hughes said.

So in 1986, *UPS* acquired *Roadnet* Technologies of Hunt Valley, Md., a pioneer in the technique of storing digitized maps in a computer database, according to Mr. Hughes. Using these databases, *Roadnet* created a computer system to help dispatchers route vehicles more efficiently, he added.

To develop communications, *UPS* bought II Morrow (pronounced tomorrow), a Salem, Ore., company that builds vehicle positioning systems based on the Loran-C radio navigation aid used by ships and small aircraft.

II Morrow also had a manufacturing plant where *UPS* installed new electronic assembly machines. Mr. Hughes says that *UPS* can now equip its fleet for about $1,500 per vehicle.

Moreover, the company can introduce on-demand services without raising prices, Mr. Hughes believes. "Things that were not feasible at $5,000 look a lot different at $1,500," he said.

Over the last two years, *UPS* has been testing *Roadnet*'s maps and computerized *scheduling* along with II Morrow's low-cost radios and remote digital terminals at another subsidiary, Red Arrow Messenger Service in Los Angeles.

Red Arrow now has a working prototype of the *UPS* tracking and communication system of the future, Mr. Hughes said.

"It's completely paperless," Mr. Hughes said. "Quite a change for a company who's most advanced equipment two years ago was a telephone."

Information from a typical *pickup* call is entered into the computerized order entry system, which transfers the order via a local area network to the computer-assisted dispatching system, Mr. Hughes explained.
Using Loran-C, a computer terminal displays a map showing the location of all the dispatcher's vehicles. A *Roadnet* computer program selects the closest messenger and the dispatcher sends *pickup* instructions via the II Morrow radio network for display on a digital terminal in the driver's vehicle. The dispatcher can watch the messenger's movements on his display.

After *delivery*, the driver transmits the name of the signer back to the order entry computer, an invoice is itemized, calculated, and the transaction is complete. Although bills are now printed and mailed, electronic billing is now being tested, Mr. Hughes said.

Using Red Arrow, *UPS* is experimenting with the acceptance and pricing of very sensitive shipments for *delivery* within one or two hours in the Los Angeles area. The Red Arrow system could allow it to expand to other major cities, in competition with local messenger services.

UPS also has introduced on-demand *pickup* for air shipments, similar to that offered by itscompetitors. The first test of On Call Air began recently in Dallas and Philadelphia.

The company is happy with the results and intends to expand On Call Air, a spokesman said, but has not yet announced dates or location.
Also, Mr. Hughes believes *UPS*' new technology will enable drivers to make on-demand *pickups* along their established routes and to accept larger ground shipments as customers request them.

"We may use it to handle our hundredweight pricing option," Mr. Hughes said. This service allows contract shippers in certain cities to send a minimum of 200 pounds in various smaller packages as one shipment to a single consignee.

Large shipments usually are *scheduled* in advance to ensure that enough space will be available for them on the truck.

"Also, most of these now go LTL," Mr. Hughes said, "but with our communication capability to dynamically readapt the fleet we can handle more volume without jeopardizing service."

DESCRIPTORS: TRANSPORT; AVIATION; TECHNOLOGY; POSTAL SERVICE;
               TELECOMMUNICATION
COMPANY NAMES (DIALOG GENERATED): *Roadnet* Technologies ; *UPS*

 5/9/25   (Item 1 from file: 727)
DIALOG(R)File 727:Canadian Newspapers
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00853258
UPS drivers go high-tech
Gazette (Montreal), Final ED, P E1/BREAK
April 04, 1991
DOCUMENT TYPE: NEWSPAPER JOURNAL CODE: GAZ LANGUAGE: ENGLISH
RECORD TYPE: FULLTEXT SECTION HEADING: Business
Word Count: 72

TEXT:
COLUMN
MISSISSAUGA, Ont - MISSISSAUGA, Ont. - Drivers for *United* *Parcel*
Service will soon be
using hand-held computers that hold all *delivery* and *pickup*
information, including customers' signatures. The company has
announced a $420-million program that will, by mid-1992, equip
every driver in Canada with the devices, called DIADs. With a DIAD
(*delivery* information acquisition device), drivers can call up the
day's *schedule* and get route information. *Roadnet* Technologies
Inc. and Morrow Inc. , both subsidiaries of *UPS*, provided software
and manufacturing specifications.
    Copyright Gazette (Montreal) 1991

DESCRIPTORS: *UPS* COMPUTERS
?

INTERNET ARCHIVE
WayBackMachine

Enter Web Address: `http://` | All ▽ | **Take Me Back**   Adv. Search Compare Archive Pag

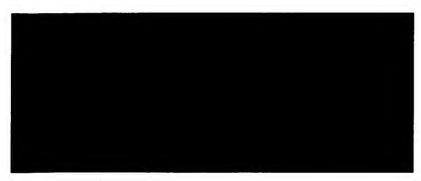Searched for http://www.roadnet.com   **60** Results

Note some duplicates are not shown. See all.
* denotes when site was updated.

Search Results for Jan 01, 1996 - Jan 14, 2003

1996	1997	1998	1999	2000	2001	2002	2003
1 pages	6 pages	8 pages	7 pages	14 pages	15 pages	0 pages	0 pages

1996	1997	1998	1999	2000	2001
Dec 30, 1996 *	Jan 21, 1997 *	Jan 09, 1998 *	Jan 25, 1999	Feb 29, 2000 *	Feb 01, 2001 *
	Jan 21, 1997 *	Feb 01, 1998 *	Jan 28, 1999	Mar 03, 2000	Feb 03, 2001
	Jan 21, 1997 *	Jun 13, 1998 *	Feb 02, 1999	Mar 04, 2000	Feb 04, 2001
	Jan 21, 1997 *	Nov 11, 1998 *	Feb 08, 1999	May 10, 2000	Mar 01, 2001
	Jun 30, 1997 *	Dec 02, 1998 *	Feb 24, 1999	May 11, 2000	Mar 08, 2001
	Oct 16, 1997 *	Dec 05, 1998	Oct 07, 1999 *	May 12, 2000	Apr 01, 2001
		Dec 05, 1998 *	Oct 12, 1999	May 19, 2000	Apr 05, 2001
		Dec 12, 1998 *		Jun 06, 2000	Apr 18, 2001
				Jun 19, 2000	May 16, 2001 *
				Aug 15, 2000 *	May 19, 2001 *
				Oct 04, 2000 *	Jun 20, 2001 *
				Oct 18, 2000	Jul 20, 2001 *
				Dec 04, 2000 *	Aug 07, 2001
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					Oct 07, 2001

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